

# COAL AGE

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## JUST WHAT IS THE OUTCOME?

FROM start to finish the convention and exposition at Cincinnati was the largest and most important gathering of coal-mining men ever brought together in the history of the industry. The three-thousand visitors to Cincinnati, almost all of whom were closely connected with the coal business as executives, managers, engineers and financiers, canvassed its problems from coal face to markets. Many companies devoted much time and no little expense to attendance on the practical sessions and exhibits.

What is to be the outcome? If it is to be something more than a mere junket it should be followed by intracompany conferences. We hear much about vocational education for workmen and as to the value of a manual laborer spending his evenings in study. However, what we need as much or more is vocational study by the operating heads, conferences between them and discussions of their mutual problems. At no time is that more vital to success than after a conference and exhibit like that at Cincinnati. A clear conspectus was given at the Mining Show of the advance in mechanical appliances made during the past year and men got together and compared notes on their experiences in practical operation.

In too many companies the

story has gone the rounds that the "Old Man" is set in his ways and considers it his main duty to frown on innovations and cancel requisitions. The personnel consequently has viewed the whole problem of operation in a glum and disheartened manner, thinking that parsimony is more valued than economy and believing that a few men removed from the payroll would be more acceptable to the Big Boss than an increased tonnage per dayman employed.

Now is the opportunity for the executive to get together with the staff to remove that impression and to decide what changes must be made whereby costs may be lowered. Only those who make such changes can hope to continue in business. As has been said, "It is modernize or quit."

It is time, therefore, to call intracompany conferences, to revolutionize methods of operation as well as to wipe out inefficiencies which have been recognized by engineers for years but have been allowed to continue due to the division of authority, the aversion of some men to certain kinds of operating problems and to the feeling that the Great Boss is the "Big No" when any proposition is to be decided which entails the expenditure of money.

*Now, the Cincinnati meeting is over—What is to be the outcome?*

### Men with the Hoe

EDWIN MARKHAM'S sonnet on the "Man with the Hoe" describes most of us. We are held by the toils of our mutual relations so tightly that many of us cannot find time to look ahead and find out where we are going and which is the better way of getting there. Like the men in the woods we plunge too often in circles when an observation of the sun or of the moss on the trees might orient us and give us some chance of getting direction. Such a moment's opportunity was afforded us at Cincinnati. New tools to our hand, new ideas to our heads, new plans for our imaginations were provided. It does us all good to throw down the hoe long enough to think anew and plan afresh.

But too many, we fear, will go back and find their desks and mines cluttered with uncompleted tasks, and the will to think, to plan, to consult and to advise will die aborning. How many a strong man has been overborne by routine, by the multiplicity of meticulous duties, by a flood of work that fills from meal to meal, from rise to set of sun! Many a man rested, given opportunity and a little pause for thought might do by planning and machinery what now he does inefficiently by brute force.

### Are You a "Mud Horse"?

MANY a running horse can make speed over a good track. It takes stamina to lead the race over a muddy course. Too many of our operators attain their best form when the going is good. It is a real success only when results are obtained under unfavorable circumstances such as are now confronted. The mud horses that make headway in unfavorable weather are now leading the race. Efficiency, system, foresight and a certain venturesomeness in directions not charted put them in the lead. Given high prices and unlimited demand, some men show speed and courage, but given a depressed market, they fail utterly. These difficult days prove one's staying qualities. Where others give up in despair, the men of real constructive genius change their methods, adopt new machinery and stay in the race.

### It's All in the Feed

A few years ago, when the electric storage-battery locomotive was first placed on the market, many engineers were dubious of its possible success. One objection raised was the small capacity of the driving motor. The claim was made that its horsepower was too low for the size of the locomotive. Some engineers said that the manufacturers would go through a development period and gradually increase the motor capacity until it would be somewhere near ten or twelve horsepower per ton.

The years have rolled by; many mules have been replaced; in fact, in some mines it would seem strange to see a mule. The storage-battery locomotive has won its place.

Strange to say, its motors have not been greatly enlarged, yet the locomotive has been a success. What is the secret of the small motor? Is it not that the speed of the storage-battery locomotive is slower than that of the trolley locomotive? There is, however, another reason; the storage-battery locomotive carries its own power plant with it, and consequently the voltage drop between the battery and the motor is nil. The motor receives nearly full rated voltage all day. Does

not this indicate that motors supplied with proper voltage will do the work of larger motors which receive low voltage? Then why not reduce the resistance of feeder circuits, install and maintain good bonding, put the direct-current power converting equipment nearer the load centers and make the substations automatic?

### Outside Looking In

ANY industry is likely to be so absorbed in its own viewpoint that it cannot see its own woods for the trees. The coal industry is no different from any other in that particular. So it was refreshing to see that the National Coal Association at its convention in Cincinnati more than half filled its program with outsiders. They said things that made two points clear: First, that some of the thinking men of this country outside the coal industry are just beginning to get a true perspective of coal and its major problems and, second, that it is worth while, after all, to meet the public at least half way so that more thinking men can get that same perspective.

It did 300 big coal men good to sit still and hear R. S. Kellogg, secretary of the News Print Service Bureau—an utter stranger to coal—tell them in brisk, interesting style that he believes organized coal men can do much for their industry along trade-association lines and just how he thinks they ought to work. He knows trade associationism and he is just beginning to learn enough about coal to be able to apply his fundamental knowledge to it. His was an outside viewpoint and he surprised many a man wise in coal by showing him that an outsider can think soundly about the bituminous-fuel industry. If some man well known in coal had voiced the same thoughts with equal authority and force, those thoughts would not have registered so deeply on the association.

It was good also that the viewpoint of the retailer was brought in, and of the expert merchandiser and of the head of the world's greatest news-handling agency. Such men as those are outsiders but they are men of the types which count heavily in making up the public mind about coal. The outside viewpoint is a good thing for the coal industry to get. In getting it the industry will learn better how to maintain its public relations.

### Why Work in the Dark?

THE public utility power companies once sold electrical energy and only metered that which the consumers used. They didn't know how much power was generated, how much was lost, neither did they know the boiler efficiencies or the cost of distribution. With a blind faith in the possibilities of electric power they struggled on—and some were successful.

A day came, however, when the leaders realized that if profits could be made in ignorance and darkness, better returns could be obtained by a thorough knowledge of power generation. Meters were used, records obtained and studied until now every up-to-date power company official has operating data on every detail of manufacture and distribution.

The advantages of electric application to mining have been so obvious that even some of the largest coal companies have no data upon the operating characteristics of their most important machines. There may be no question about the fact that this electrically driven equipment is saving money, but cannot better results be



obtained? A thorough survey of present electrically operated apparatus may prove it to be more efficient than the officials believe. Should it so prove it will more quickly spur them to further modernization.

A hoist may be causing continual interference with other equipment by peak loads which open the main-line fuses. If that condition is known it may be corrected. A few underloaded induction motors may be using up all the kilovolt-ampere capacity of a transformer bank and necessitating the purchase of larger transformers. Knowing the cause of trouble induction motors of the right capacity can be installed. The high equipment maintenance costs may be due to low voltage on the supply lines. A feeder line may correct this evil when discovered. Perhaps also an examination will show that the motors you are purposing to replace with others are of ample capacity for the work, if the proper voltage is supplied.

Now it is time to turn on the light, obtain test data and find out the facts about transformers, motors, substations, power houses, transmission lines and distributing systems; to effect savings in operating costs, power bills, capital charges, etc.

### Economy in Transportation

**T**HOUGH loading machines and conveyors are essential to utmost economy, continuity in operation will produce an important decrease in costs secondary only to that effected by mechanical loaders and belts, scrapers and shaking chutes. With such equipment, it is true, operating continuity is of paramount importance, but even with hand loading, operating without delays is productive of economies that cannot be safely overlooked.

Operators are beginning to realize this, and as a result switches and frogs, mine cars and locomotives that operate without derailments are making remarkable headway. As at the recent exhibition at Cincinnati the loading machines were in a tent in the rear of the hall it was a little difficult to realize that the exhibit was a mining show, so prominent were the booths devoted to transportation. That phase of mining seems to be thrusting itself more and more on the attention of mining men. One can almost foretell the time when every mine will have its transportation engineers who will be responsible for equipment that will keep the mine working steadily without the waits that derailments and breakdowns inevitably cause.

Heavy rails and ties that will not give and break the electric bonds; switches that will be of correct gage throughout and switch points that will not break at the ends, that will close tight and not derail cars or locomotives; frogs that will retain their shape, wheels that will not wobble or become loose, that will not develop false flanges or flat spots; bearings that will run with minimum wear; cars which have strong but flexible frames, all are means to the final end.

Mines are miniature railroads, and not so miniature after all. The absolute need for continuity of operation makes it necessary for every coal company to regard its transportation problem as of paramount importance. Heavier cars and higher speeds are making new standards necessary. No one can foresee where the increase of car size will end. Already where cars enter rooms five- and even eight-ton cars are being constructed. Where cars are not transported to the working place, they may be made far bigger, and if by an extension of the conveyor system, all the coal is transported to

the main haulageways, they may be made even larger still.

There is hardly any limit to the size mine cars may attain with such a system of loading. We might even take railroad cars into the mine were it not that when they are brought to the surface they must be dumped so that the coal can be cleaned on picking tables. Where the coal is clean, however, and top and bottom material does not enter the product, such cleaning would not be necessary. Sizing, if demanded, could be done with advantage at the receiving point, thus eliminating from the screened sizes the coal that is degraded in railroad transportation.

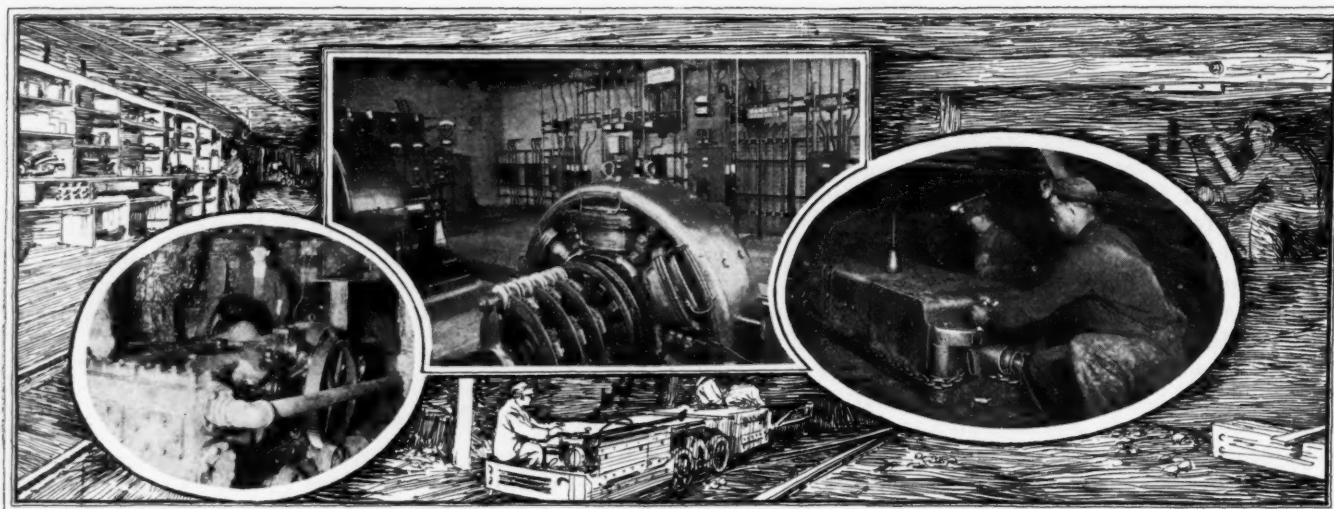
### Where Is the Nationalization Noise?

**F**OR some reason the great clamor for nationalization of coal mines has subsided during the past several months. What is the reason? Can it be that the coal industry has at last done so good a job of producing coal and delivering it to the people of the country at a reasonable price that everybody is satisfied? The industry certainly has been doing that sort of producing and delivering, and if public satisfaction has been the result, then let the coal man congratulate himself if he can, as he anxiously scans his bank balance to see if he can pay the rent without fear of overdraft.

But everybody is not satisfied. There is no use expecting that, no matter how well the industry has done its job lately. In spite of the fact that the price of coal to the consumer is lower now in proportion to producing costs than it ever was in history, there are buyers who are not satisfied and are waiting for it to go lower. *Coal Age* index on the prices of all important soft coals throughout the country had sagged down to \$2.05 the week of May 5 and we hear of eastern Kentucky contract mine run at \$1.65 with spot mine run of that region bringing \$1.25! It costs a good deal more than \$1.25 to buy a ton of dirt for the garden. Yet part of the present slackness of the market is due to the fact that "these coal fellows may have to give it to us for less yet." At this rate of buying, next fall is going to see a strong call for coal, a car shortage, and prices somewhere above the cost of production. Then listen for the clamor. There will be the voice of the nationalizationist abroad in the land.

Secretary Hoover, speaking at Cleveland, May 7, said nobody wants government control of the bituminous coal mines any more. And he is correct—for the present. The elaborate plan which a special committee of the United Mine Workers prepared, telling the country "How to Run Coal," didn't even get a good airing in the miners' international convention last February. When the cry for nationalization doesn't sound in Tomlinson Hall, Indianapolis, then it doesn't sound anywhere—except down among the coal miners of Greenwich Village. So it is true the demand for both government ownership and control is dead.

It is dead because, for once in recent history, there has been a glut of coal for almost a year. The operation of the glut on the coal business has been far from painless, but at least the coal man has rid himself of one worry—the public demand for Uncle Sam to seize the bituminous mines. The chances are this demand will never again become insistent in view of the general world-wide failure of government operation of public utilities. But we may confidently expect to hear voices on the subject as soon as the industry again becomes a going concern with a profit in the price of coal.



## Electrical Engineers Discuss Ways in Which Savings in Power Cut Mining Costs

Applying Storage Batteries to Cutting Machines and Main Line Locomotives—Economy of Multiple-Speed Fan Motors—Voltage Regulation—Standardization—Inspection—Testing

### Can the Sparking Trolley Be Eliminated?

**I**MPROVEMENT of electrical methods in coal mines so as to increase safety was advocated in a meeting of the American Mining Congress held on the morning of May 12. R. L. Kingsland, electrical engineer of the Consolidation Coal Co., described the efforts being made by that company to increase safety in a gaseous mine by the use of storage batteries for coal cutting and main-line haulage. The practice in the past, he explained, had been to use compressed air in gaseous mines as motive power for haulage. He said that the company had attempted to standardize the voltage for cutting machines so that standard motors might be used drawing their energy at 220 to 250 volts which is the standard voltage. This makes it readily possible to use standard equipment for charging batteries. For the past year an arcwall mining machine has been used operated by power furnished by a battery truck containing 117 lead cells, storing 80 kw.-hr. of energy. The battery truck runs on its own power but it has no extra power for haulage purposes. A 30-hp. motor with double reduction gear, chains and sprockets is used. The power consumed per ton of coal mined averages between 0.2 and 0.25 kw.-hr. operating in the Pittsburgh seam.

The company believes that from 20 to 24 places can be cut by this machine in eight hours and that it can be done more cheaply by storage batteries than by current from the trolley.

A main-line storage-battery locomotive has been in operation for three months. This locomotive is provided with two batteries with the intention of running it a full shift of eight hours

using one battery for the first four hours and the other battery for the period after the midday suspension. This will be necessary if the locomotive is to have full power for the whole eight-hour shift.

The locomotive weighs six tons, each battery containing 117 lead cells and having a capacity of 108 kw.-hr. It delivers current at an average potential of 225 volts. This gives a total current capacity of 200 kw.-hr. for each eight-hour shift. The locomotive is equipped with two 250-volt motors. The average length of the round trip is now 8,400 ft. It hauls sixteen mine cars, each having a capacity of from 2 to 2½ tons.

### MORE POWER HAULING THAN CUTTING

The power consumed per ton of coal hauled is less than that for cutting the same quantity of coal. To date it has been necessary only to use one of the two batteries for the entire shift. In the near future, however, with the increase in the length of the round trip it will be found necessary to use both the batteries. The longer the haul the more power is used because the time lost at the bottom and side track does not change with the increased length of distance traveled and so a locomotive with a short haul loses a longer period in delays and does not use as much current as one with a longer haul which is more of its time traveling on the road.

It will be a difficult problem to get a battery big enough to supply power to haul coal a distance of two or three miles. Up to a two-mile haul it is entirely practical to get two batteries which will do all the work of which one locomotive is capable. Mr. Kingsland added on being questioned that the life of the batteries is closely that guaranteed by the manufacturers.

R. D. Hall, engineering editor, *Coal Age*, described the equipment for haulage which the Phelps Dodge Corporation proposes to install. This has already been published in *Coal Age* in the issue of May 1.

Graham Bright, of Howard N. Eavenson & Associates, said that the conditions at the Phelps Dodge operations were different from those at the Consolidation mine. As he understood it the locomotives at the Phelps Dodge operation were to come to the surface and be operated on the trolley whereas Mr. Kingsland's were kept underground. Consequently the Phelps Dodge locomotive could be charged while on the surface, whereas such a source of power was not available to Mr. Kingsland. This would make it possible for the Phelps Dodge Corporation to get heavier service from the locomotive than it could hope to get if the battery could not be charged in the manner described.

### OTHER ADVANTAGES POINTED OUT

L. C. Illsley, electrical engineer, U. S. Bureau of Mines, said that storage-battery locomotives and mining machines had advantages that had not been discussed by Mr. Kingsland. Where the trolley system was used the electric current could not be under close supervision especially at night and at other times when the mine was not under operation. If the trolley wire was alive at such times accidents might happen with no one present to shut off the current and correct what damage might be done.

Mr. Detweiler said that he feared that even if storage-battery locomotives were used a dangerous condition might result should a wreck occur, especially in the presence of a cloud of coal dust.



Mr. Kingsland declared that batteries had such heavy and strong jars that they would stand considerable violence without serious injury. In wrecks of storage-battery locomotives they had never had any fires. Though some hazard undoubtedly existed it did not approach that accompanying the use of a trolley locomotive.

Graham Bright said that, of course, such equipment could not be made hazard-proof. One item in favor of the safety of the storage-battery locomotive was that it traveled at a slower speed than the trolley locomotive and that made wrecks less frequent. A roof fall was another source of danger but only in the presence of gas or dust.

C. L. Harrod, electrical engineer, Indiana Coal Operators' Power Association, said that he had made a test showing that the power cost was one cent per ton lower with the trolley type of locomotive than with the storage-battery type. Mr. Kingsland said he had not made any careful tests, but he thought the input to the storage battery would be less or at least little in excess of the input to a trolley locomotive. He believed that the advantage of using the off-peak current would make the use of the storage-battery locomotive advantageous. Mr. Harrod said he gave no consideration in his test to the period of the day during which the current was taken from the line. The mining company merely wanted to know the relative quantity of current used. All current was figured at 2c. per kilowatt-hour, and the outcome showed that the trolley locomotive gave a rate 1c. per ton lower than the storage-battery locomotive. He did not suggest that this would be universally true but only that it was true in the case he investigated. The batteries were in first-class condition when the test was made. The mine had several steep grades.

Mr. Kingsland, questioned as to the power used per ton hauled, referred to what he had already said and stated the efficiency of a storage battery was not much better than 50 per cent but that of the wiring in most mines was considerably less. The trolley would

show up the better as regards the use of power from the kilowatt-hour standard but on the other hand the storage battery gave the better load factor.

W. Van C. Brandt, manager Power Battery Division, Electric Storage Battery Co., said that the current used in the charging of storage batteries depended on the way in which they were charged. It is possible to waste current in charging if the right equipment is not provided and if the equipment thus installed is not properly used. A storage battery has an efficiency of 72 per cent if you measure the energy at the battery terminals. If you convert the power supplied a lead-cell battery you have another loss in

converting apparatus. More attention should be given to the method of charging. In a recent instance a company had invested \$45,000 in charging equipment and was expecting with reason to get that investment back in the savings made within a year from installation. With the old manual control it is possible to overcharge your battery and use more current than you actually need. By the constant-potential method the exact amount of current required by the battery is fed to it and at the end of that time the current is automatically shut off. When your power costs are too high it will pay you to look into your charging equipment and methods.

### Can Save Power by Slowing Multiple-Speed Fan Motor

**I**N his address A. B. Kiser, electrical engineer of the Pittsburgh Coal Co., emphasized the value of variable-speed motors for fans where conditions made the use of several different speeds desirable. He said such fan motors were advisable because they enabled the speed of the fan to be regulated, (1) so that the quantity of air could be adjusted to the needs of the mine when in full operation, (2) so that the speed could be reduced during the night, on idle days or during slack operation, (3) so that the ventilating current could be increased when required, (4) so that the circulation of air could be greatly reduced in case of a mine fire and (5) so that the speed could be regulated to meet the demand whenever the ventilating system is revised.

Whenever such a motor is used the fan has all the advantages obtained when driven by a steam engine. The saving effected by the use of variable-speed motors can be illustrated best by examples. Assuming 306 working days per year at a mine and that the speed of the fan can be reduced from 4 p.m. to 2 a.m. when the firebosses enter the mine to make their examinations. The fan will then operate for ten hours at reduced speed or for 3,060 hr. during the year. Sundays and holidays comprise 59 days in the year or 1,416 hr.

Adding these together, the speed of the fan may be reduced for 4,476 hr.

A 6x3 ft. fan circulating 100,000 cu.ft. of air per min. against a 3-in. water gage when driven at 305 r.p.m. would require 51 kw. at the fan. Reducing the speed to 209 r.p.m. and diminishing the volume of air in circulation accordingly, only 26 kw. would be required. This saving of 25 kw. for 4,476 hours would represent 111,900 kw.-hr. which at a cost of 1c. per kilowatt-hour would cost \$1,119 per year.

Taking a larger fan 16x6 ft. producing 500,000 cu.ft. of air per min. at 5-in. water gage and running at 137 r.p.m. the energy required would be 525 hp. A 10-per cent reduction in the speed of such a fan during the slack period would save 102 kw. This is a yearly saving of 456,552 kw.-hr. which at a cost of 1c. per kilowatt-hour would make a saving of \$4,565.52 per year.

At many mines a disk fan can be used operating at a low water gage. Assuming that such a fan is 8 ft. in diameter and circulates 100,000 cu.ft. of air per min. at a 1-in. water gage, running at 353 r.p.m. it will require 32 hp. If the volume of air is reduced one half, or to 50,000 cu.ft. per min., the saving will be 21 kw. Assuming that this saving is for 4,476 hr. it will aggregate 93,996 kw.-hr. and at 1c. a kilowatt-hour the saving in cost will be \$936.96.

#### MOTOR SAVED \$3,065 IN YEAR

During 1923 many mines ran short time. One mine was fitted with a fan driven by a variable-speed motor. When on high speed the fan required 65 kw. or 569,400 kw.-hr. per year. As a matter of fact the speed was reduced and only 262,856 kw.-hr. were used. Thus 306,544 kw.-hr. were saved. This was a saving in cost of \$3,065.44.

Another mine has a fan running at high speed requiring 118 kw. The fan was operated at 128 r.p.m. In the course of a year such a fan would need 1,033,680 kw.-hr. The power actually used was 785,720 kw.-hr.; and the saving in power was 247,960 kw.-hr. which at a charge of 1c. per kilowatt-hour would be equivalent to a saving in cost of \$2,479.60. This mine has been idle since the first of the year.

At another mine the quantity of air is reduced during idle periods to 175,000 cu.ft. by operating the fan at 130 r.p.m. instead of 154. The difference in power required is 39 kw. As the reduction in speed is for six hours in every twenty-four the saving is 234 kw. or \$2.34 per day, or figuring in Sun-

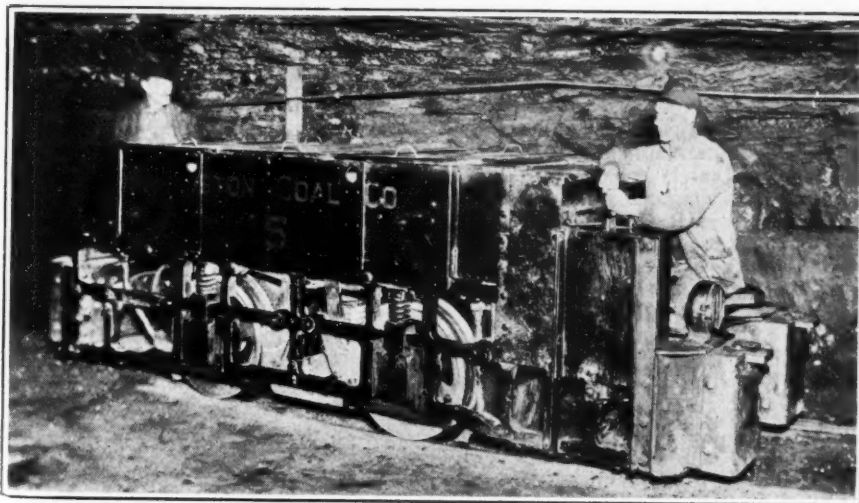


Fig. 1—Storage Battery Haulage Locomotive

In many mines storage battery locomotives are used to accomplish two results—first, to avoid the danger of gas ignition and second, to equalize the load on the power plant. In addition to this, however, the accumulator locomotive is a self-contained unit and can travel anywhere in the mine where track is available.

days \$98.10 per month. The Pittsburgh Coal Co. has 70 fans in operation. Of these 65 are electrically driven, 59 of them having variable-speed drives. Five fans are steam driven. Ten of the fans are 250-hp.; six are 150-hp., the rest 75-, 40- and 20-hp. fans.

Graham Bright said that the subject introduced by Mr. Kiser was two-fold: (1) Is it desirable to reduce the ventilation during idle periods? and (2) If it is desirable what type equipment should be used for that purpose?

J. H. Edwards, electrical engineer, Elkhorn-Piney Coal Mining Co., said that one of the company's mines was ventilated by a 3x7 ft. fan that had been running for fifteen to twenty years, twenty-four hours a day. The power bill for that fan was about \$600 per month. The energy supplied to this fan motor was metered and a few years ago the company sought means to reduce the cost for running fan when the mines were shut down.

At an expense of \$800 a small horsepower motor was connected to the fan. By running the fan at reduced speed, with the small motor, when the mine was not operating at full capacity or was not working at all a saving was made amounting to \$300 per month. It is easy to see the large saving that could have been made if this had been done earlier. The company continued this slowing of the fan for a year or more and even at night during the regular operation of the mine. Lately it has been thought better not to slow down the fan.

Mr. Bright remarked that whether it was advisable to slow down the fan or not depended upon circumstances. Where a large fan is used this is an important question as large quantities of energy are involved, and any advantage should certainly be taken if conditions permit. Mr. Kiser is using a variable-speed motor, but there are two-speed motors which do not give such a wide choice of speeds but nevertheless might serve the purpose. The motor with two speeds in the ratio of 2 to 1 is much simpler than the variable-speed motor.

#### FREES METHANE AND REMOVES IT

W. H. Luxton said he believed there were some advantages with a variable-speed motor. In a mine ventilated by a blowing fan the workings are under pressure. Any reduction of that pressure allows the gas to escape into the roadways where it can be removed by the fan. With a steady pressure this gas has less opportunity to flow to a point where it can be driven out.

J. F. MacWilliams said that he believed that inquiry should be made in every case to ascertain whether two speeds will serve or whether a number of speeds are necessary. With a variable-speed motor you get a power factor of 58 per cent at 350 r.p.m.; 92 per cent at 550 r.p.m.; then starting on the second connection of the motor 75 per cent at 550 r.p.m. and around 94 per cent at 750 r.p.m. If it is necessary to have a number of speeds this is the type motor to be used. If two speeds will meet your need you can use a motor that at 695 r.p.m. will give you 90 per cent efficiency. At about 335 r.p.m. it gives 40 per cent efficiency.

The power factor of the brush-shifting motor is 54 per cent at 335 r.p.m. At maximum speed, when Y connected, the power factor is 94 per cent and then drops to 75 per cent at slow speeds, when delta connected, and increases to 97 per cent at maximum speed.

Mr. Mitchell said that if a mine generates gas it is necessary to keep it well ventilated. To slow down the fan might result in the ventilation being reduced to such a degree as to not make the gases harmless. If the company using the fan is not operating a gaseous mine there is no need to operate the fan when the mine is idle. Consequently it is first of all necessary to determine what is the object of the fan, to make the mine safe or to furnish the men with sufficient air. If the fan is run to make the mine safe, the fan can be shut down when no men are in the workings.

Mr. Bright in his comments remarked that the first object should be to keep the mines safe at all times and added that if that could be done with the fan running at half speed provision should be made to take advantage of that economy.

J. O. Durkee, of the Bethlehem Steel Corporation, said that men were more lax during idle times than when the mine was operated continuously. Consequently it was his opinion that the gaseous mine should be better ventilated when idle than when working. The Bethlehem Steel Corporation has

#### Put Rated Voltage at Face and Lower Power Costs

**A** LOSS of \$410,000 in power alone, further losses from burnouts and consequent repairs and still further losses from delayed operation were mentioned by Carl Lee, electrical engineer, Peabody Coal Co., Chicago, Ill. as reasons for renewed effort on the part of every operator to put the rated voltage at the mine face thus lowering power costs.

"The power and maintenance cost of electrical equipment around our mines is not a large percentage of the total production cost of coal. Once the miners' wage rate is set, as it now is for a period of three years, there is no honest reduction that can be made in that item and it therefore becomes necessary to consider other ways to reduce the cost per ton.

Statistics indicate that the use of electricity in coal mines is increasing at a very high rate. Accurate figures on the number of motors, mining machines and locomotives are hard to obtain, but can be approximated. Correct figures on electrical power consumption are not obtainable because a large percentage of mines do not meter their power, and, in fact, many coal companies do not even weigh their boiler coal. However, by using the data that is available we can arrive at reasonably close figures.

Taking a general average of hard and easy cutting, high and low coal, the power used will probably be about 0.40 kw.-hr. per ton. If 50 per cent of the coal is undercut, then there would be 100,000,000 kw.-hr. used annually for that purpose.

seven mines closed down at present. The company had some mines where with 1,000 cu.ft. per man in the mines and 70 per cent of the air reaching the working faces, the return tested 4.7 per cent methane. If such a mine were idle but had pumpers working in it, it would be suicidal to reduce the fan speed. He had noticed that many disasters had occurred as a result of reducing the speed of the fan. The great gaseous mines of Pennsylvania and West Virginia should have about the same volume of air when working as when idle.

C. L. Harrod, electrical engineer, Indiana Coal Operators' Power Association declared that in Indiana, the quantity of air required was based on examination of the gas in the return. He thought that the fan speed should be reduced at idle times provided that the speed reduction was never so great as to reduce the ventilation below the limit of safety.

R. L. Kingsland said that the efficiency of ventilation was greater by 5, 10 or even more per cent at night than during the day when the mine was working because doors were not opened and trips did not interfere with the passage of air. This was one reason for favoring the use of the variable-speed motor. Another was that certain external atmospheric conditions were favorable to ventilation and when they were available less assistance from the fan was needed.

With gathering locomotives there is a very wide range of conditions encountered. Different grades, sizes of cars, kinds of bearings, methods of handling, types of locomotives, all effect the power consumption per ton. Possibly 0.25 kw.-hr. per ton would be somewhere near the general average. If there are 100,000,000 tons gathered at this rate, then 25,000,000 kw.-hr. would be used.

Haulage locomotives present a complex problem because of very widely different conditions. With improved track and modern locomotives the power used per ton is low, about 0.20 kw.-hr. for a general average. A large percentage of all the coal mined is hauled with electric locomotives, and therefore, assuming 400,000,000 tons hauled at 0.20 kw.-hr. per ton, we find that 80,000,000 kw.-hr. are required for this purpose.

Omitting pumping and all other inside power loads, there would be about 205,000,000 kw.-hr. used annually for bituminous coal production alone. At 2c. per kw.-hr. this would cost \$4,100,000. If the average loss is 10 per cent there would be \$410,000 loss in power alone. The loss in production and the added cost of maintenance would probably be a greater item.

At the outset, however, we must realize that we cannot afford to make the feeders large enough to carry all this power from the generators to the motors with the same efficiency as is used in industrial plants or home lighting. There are several reasons for this. The principal one is the long distances and heavy currents which make the losses excessive. Then again, the load factor is generally low. Even



during the day the load factor will be as low as 50 per cent or less. The 24-hour load factor would then be only 16½ per cent and the yearly load factor possibly 10 per cent. Thus the ratio of the average use of the copper for a year to the use at the peak load is 10 per cent.

However, the electric service must carry the peak load and our problem today is to find how to reduce the losses to the point where the total cost will be a minimum. In a large majority of coal mines the wiring is smaller than required to give a reasonably low total cost.

First, there is a loss due to drop in voltage. This is a direct power loss in the wires and motors. Second, there is a loss due to armature, field, and rheostat burnouts caused by low voltage and consequent repair cost. Third, there is a loss of production which affects not only the investment tied up in the electrical equipment, but all other parts of the mine. This is probably the greatest loss of all. These three principal losses are a direct result of insufficient copper, or its equivalent, to carry the necessary amount of power from the generators to the motors. The proper method of calculating the size of copper necessary and the right tests to use to check such calculations for new mines, or all mines where the circuits are already installed, is a serious and difficult problem.

#### KEEP DIVERSITY FACTOR IN MIND

Using the nameplate ratings of motors is good if properly applied. Ohm's law for estimating voltage drop must be the basis of all our calculations, but due allowance should be made for the diversity factor and demand factor of a single motor or group of motors. The size of the wire used in various circuits depends greatly upon the load, but is not directly proportional to the connected horsepower. We should try, therefore, to formulate general rules from which the hundreds of engineers and electricians at our coal mines can check the wiring and arrive at more accurate results.

Articles have appeared a number of times in the columns of our trade journals explaining how to make voltmeter tests on complete lines of wires. Such tests can be made accurately, but in most cases, I do not believe that they will be of any material benefit. In my opinion, a test on the return circuit should be made by an individual joint or bond test. The defective bonds can then be marked, and repaired or replaced as that is the only real remedy."

At the conclusion of Mr. Lee's remarks Graham Bright asked what is a permissible drop in voltage. Mr. Lee replied that the allowable drop depended on circumstances. If on a line there were several gathering locomotives and mining machines, the voltage drop should be kept at a minimum, for at all times some of these would have motors running. It would be a waste of power not to give them a good line voltage, but it is different where you have an individual motor which at times makes unusual demands on the line. If, for instance, you have a single locomotive and there is no pump or other machinery to make a regular

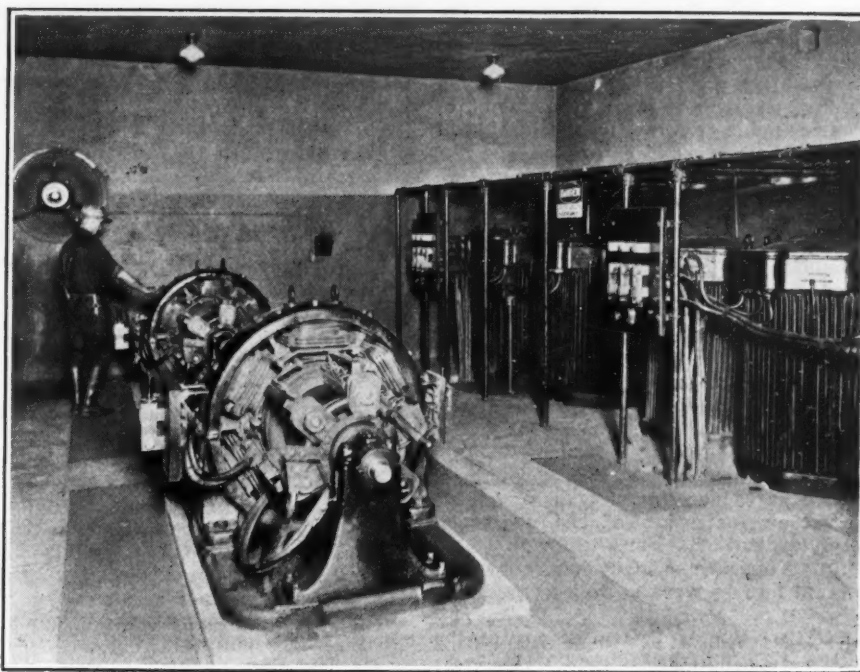


Fig. 2—Substation at Load Centre Underground

Low voltage is the incubus of mine haulage. Carrying high-voltage alternating current underground to a substation located at a load center improves the pressure, cuts down the necessary investment in copper and reduces locomotive repair bills.

draft of energy from the line, then if the voltage drops to 50 for a few seconds, the loss is heavy on that one unit but it will be so for a short time and for only one machine. Consequently it will not pay to install a feeder cable. If, however, we had six units drawing from the line and one of those six could be depended on to be working all the time then a heavy drop in voltage should be avoided by providing a feeder.

Mr. Bright said that the permissible

voltage drop was a matter of compromise. The cost of copper to eliminate all excessive voltage drops would be so great as to be prohibitive.

J. H. Edwards remarked that he agreed with Mr. Lee. His experience urged him to measure the voltage at a main distribution point. If a graphic voltmeter is put on such a line the average value for a working day can be obtained and a figure should be set for a proper average at that point.

#### How a Bulging Stock Room Beggars Its Owner

WHAT advantages can be obtained by shifting equipment from mine to mine so that each mine will have but one type of any one kind of machine and not a number of different types was explained by J. H. Edwards, electrical engineer, Elkhorn-Piney Coal Co., Huntington, W. Va., who had made full proof of these advantages in the administration of the electrical affairs of his company.

In Mr. Edwards' point of view the engineer who is responsible for the design and installation of electrically driven equipment is very apt to have a viewpoint on the subject of standardization much different from that of the engineer who must operate the apparatus in the most economical way consistent with the delivery of reliable and continuous service. Therefore, it may be well to approach this subject from the viewpoint of the electrical engineer, who is responsible for all phases of design, construction, and future maintenance; his attitude should represent what is best for those who have their money invested in the coal mining industry.

In the first place, standardization must not stand in the way of progress. It appears that it will not; for any tendency in that direction will be taken

care of in a natural way. When present types of machinery prove unsatisfactory for their changed or increased duties, or are known to be inefficient, the operator casts about for improved designs and the manufacturer continually has an incentive for trying to perfect his product. The manufacturer also knows that a new piece of equipment with real and proven merit is sure to have a ready sale, regardless of what has been the standard in the past.

The most important phase of standardization is simplification of equipment and operating methods within individual companies. Any maintenance engineer or other mine official can easily point out many instances where improvements have been made possible by lack of standardization. The many advantages of having in a single mine, in a division, or in a large group of mines, as few types and sizes of equipment as is consistent are so apparent that it seems hardly necessary to enumerate them.

It might be fitting at this point to cite a specific case of what a company operating a group of six properties accomplished in one year by concentrating attention upon standardization. By transfers from one property to another, by selling, and in a few instances by scrapping, this company eliminated nine types of mining machines and seven

types of locomotives. This does not mean getting entirely rid of each type, but rather eliminating certain types from mines where there were only a few of a given type or size. This, of course, made possible the elimination of sixteen sets of spare parts.

The total standardization of all equipment, including the above mentioned mining machines and locomotives resulted in a reduction of over \$45,000 in the value of spare parts carried in stock. Very few pieces had to be scrapped; most of the reduction was effected by transferring parts to other properties. The above figure represents only the most tangible saving effected by standardization. It represents only a minor part of the total actual yearly saving in operating expenses.

Figures indicating the amount of spare parts per ton of coal mined are often an indication of the degree of standardization. For the group of six mining operations mentioned above the actual figures were as follows:

Operation	Before Standardization	After Standardization
No. 1...	\$25.00	\$14.57
No. 2...	27.20	9.52
No. 3...	27.80	10.72
No. 4...	22.00	8.34
No. 5...	25.10	8.34
No. 6...	6.42	7.58

Note—These figures were obtained by dividing the total value of the stock of spare parts by the maximum daily tonnage.

It is concluded from the above that figures of \$5 to \$10 are to be expected, depending of course on the specific conditions. Electrical men connected with coal mining are liable to conclude that standardization is limited to equipment only. Standard methods of installation, periodic inspection, and of repair and part renewal go hand in hand with standardization of equipment toward the goal, of lower cost per ton.

#### CAN'T KEEP EQUIPMENT STANDARD

In discussing Mr. Edwards' paper T. H. Huddy, general manager of the Sudduth & Bailey Fuel Co., asked if it was possible to standardize equipment and keep it standard. Mr. Edwards replied that his company's standardization had been in effect only a short time. He would say that he did not believe that standards could be maintained indefinitely.

Eli Clemens, electrical engineer, U. S. Coal & Coke Co., said that it was important to standardize motor speeds. If the motor on a stationary machine breaks down it is convenient to be able to take a motor from some other machine and set in the place of the damaged one, so that important machinery can be kept in operation continually. The U. S. Coal & Coke Co. has standardized on certain speed motors with this idea in mind.

Mr. Newton remarked that he had been able to reduce the expense of repair parts by standardization. Seven or eight years ago his company had five or six types of mining machines and an equal number of types of locomotives. About \$250,000 were invested in extra parts, located at different mines. In some cases it was necessary to keep duplicates of parts. After standardization it was found possible to reduce the supply parts so that the stock rooms carried only \$50,000 worth

of stock and yet there were available sufficient repair parts for every machine.

Mr. Bright said that when a company had standardized its equipment it was more likely to provide the necessary replacement parts than if it had a great number of types in use. The expense of carrying a large number of parts is prohibitive.

Mr. Bailey said that standardization of equipment increased the efficiency of the employees. Having only a few types to operate and keep in repair they soon became expert in their handling.

#### Watch for Breakdowns Before They Affect Your Purse

IN INDIANA the operators have an association, known as the Indiana Coal Operators' Power Association, of which C. L. Harrod is the electrical engineer. He gave an interesting account of its manner of operation, describing how it reduced the power bills of those who maintained it.

He said that the cost of mining coal can be lowered by a survey with the following purposes in view: Improving power supply by bettering distribution, eliminating unnecessary power losses, reducing maximum demand and raising the power factor, reducing the time losses and repairing costs resultant on breakdowns and failure of power supply, eliminating inefficient equipment.

Mr. Harrod said the association had for the past three years attempted to make its electric inspections systematically, and to that end had prepared recently a printed inspection sheet to be filled out by the man making the inspection, a copy being filed with the association and another with its superintendent.

The form divides the inspection of electrical equipment into two parts, that which is a part of the routine of the inspectional forces and is made at least once a month, and that which may be designated "testing." Mr. Harrod referred in his remarks to the first subject only so as not to interfere with J. F. MacWilliams' subject "Testing of Electrical Equipment" which was to follow.

#### INSPECTORS ANSWER QUESTIONS

The routine inspections cover the following points: Lightning arresters—are they intact and properly grounded? Protective signs around high-voltage mains—are they in place? Foreign or inflammable material—is any stored near switchboard or other electrical apparatus? Exposed wiring—does it conform to insurance regulations? Converter equipment—does frame vibrate? Is there sparking at collector rings? Is there sparking at the commutator? If direct-current circuit breaker is not higher than rated capacity of machine, determine, if possible, how often breaker opens. Fan—give revolutions per minute; if two-speed motor is provided are both speeds used? If variable-speed motor is used, on what controller point is fan normally operated? Do grids heat when normal speed is exceeded? Metering equipment—does demand-chart ink properly?

Does demand-chart indicator return to correct zero at end of fifteen minutes? Does watt-hour meter creep? Is direct-current voltmeter correct at 250 volts; if not what is error? Have power company employees done any work on metering equipment during last month? Electric hoist—is safety stop properly set?

The inspectors also report on tippie motors, car hauls, miscellaneous equipment above ground, the condition of the feeder wires in the shaft, the condition and setting of main underground circuit breakers, repairs to haulage motors and mining machines. They make a ground test of the system and voltage tests during operation. They also examine the bonds.

The greatly increased volume of power used in coal mines and the increase in the value of coal consumed in mine power generating stations make it more and more imperative that every possible saving of power be effected.

#### CAN'T NEGLECT POWER PROBLEM

The operator of a coal mine is interested in the total cost per ton above ground, and any comprehensive treatment must consider the power problem in its relation to all other factors which determine the total cost. Such subjects are reliability of equipment, capacity of machinery for hauling and hoisting, ample power distributing facilities, training of local electrical operators and maintenance men, selection and installation of new equipment, are all on a par in importance with purchasing power at a low rate.

There are four major power operations necessary in the production of coal from shaft mines, namely, coal cutting, haulage, hoisting and ventilation. Of these, the first two, cutting and hauling, are done electrically in practically all mines, while the change from steam to electric operation of hoists and fans has followed in mines with the advent of central station power.

In any mine the greater portion of the cost of mining is for work done underground, and this includes that portion of the electric system used for cutting and hauling. It is also true that here are met the most unfavorable operating conditions, requiring rugged equipment and constant supervision for the detection and elimination of electrical trouble. Falls of slate, bad track conditions, and continued extensions of lines due to development all contribute to make the problem a difficult one.

#### AT 4,500 FT. COMES TROUBLE

Coal cutting machines and haulage motors are operated farthest from the source of power when the generating unit is located at the shaft or at the surface. With direct-current operation voltage conditions usually become acute at distances in excess of 4,500 ft. unless a generous amount of copper has been used in the feeders and the track circuit is in unusually good condition.

Where alternating current is used, distribution voltages can be maintained by using step-down transformers and by moving them to new load centers as development requires. In small mines where haulage motors and cutting machines are operated from the same feeders, fed from direct-current gen-



erators located at the top of the hoisting shaft, the problem of maintaining voltage becomes more complicated.

Any man who is responsible for the purchase and use of electric power, and wants to do his work well, should fortify himself with the exceedingly useful and valuable information which can be obtained with a good set of graphic instruments.

The cost of mining coal can be reduced by thorough surveys and tests with the following purposes in view: *a*, Improving power supply by bettering distribution; *b*, eliminating unnecessary power losses; *c*, reducing maximum demand and raising power factor; *d*, reduction in time lost and repair costs due to breakdowns and failure of power supply; *e*, eliminating inefficient equipment.

#### PUT VOLTMETERS TO WORK

When the haulage motors are pulling on grades in mines where the cutting machines and haulage motors are operated from the same circuits, the voltage becomes so low as to stop the cutting machines altogether. Often graphic time-voltage surveys at the working faces show where a system of cross entry tie lines installed at proper places will improve conditions to such an extent as to make possible good operation of all equipment. In most direct-current underground systems, low voltage can be corrected at very little cost by the installation, where the bottom warrants, of cross lines and automatic circuit breakers and by properly bonding the return track circuit.

Graphic tests make it possible to determine the power consumed by each machine, and a comparison with previous tests or with tests of other machines of the same size and type, shows whether the machine is in normal operating condition.

By keeping charts of all tests filed and indexed, it is possible to accumulate a fund of information that is valuable in checking up trouble, laying out extensions and specifying new equipment. A report on operation, accompanied by records taken on the spot, leaves no room for argument.

A graphic wattmeter, as used for testing individual machines and measuring maximum demand, may also be used for checking up power consumed when the mine is idle, and thus determine the power wasted due to grounds and other leaks. The procedure is to connect the instrument into the circuit and take the load curve of power consumption during idle hours. Short peaks at intervals are usually caused by the occasional operation of a locomotive. The steady part of the load will be a combination of the loads due to small pumps, converters and lights, together with any leakage due to grounds, faults, etc.

Power cost per ton of coal mined, whether purchased or generated locally, is a small proportion of the total cost of production under normal operating conditions. However, it can become a large figure by causing partial or complete loss of tonnage through failure of power supply or equipment.

Service is, therefore, the first requisite all along the line, from the source of supply to the smallest motor, and it is necessary, probably more than in any

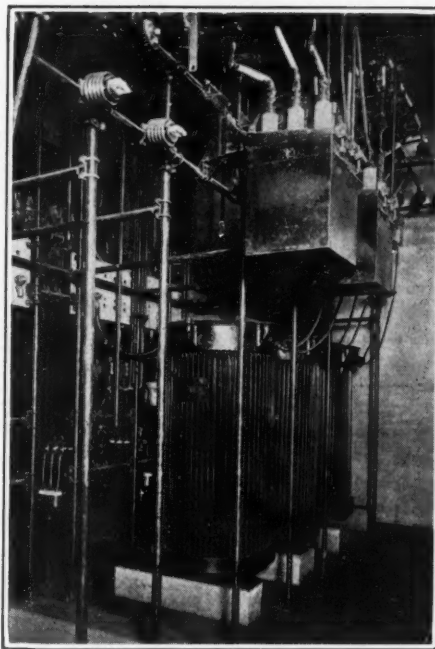


Fig. 3—Underground Transformers

Some transformer stations underground are almost if not quite as elaborate as any to be found on the surface. Carrying high tension current to load centers within the mine has done much to better the voltage on haulage systems.

other industry, that frequent electrical surveys be made and poor operating conditions improved before serious and costly delays result.

Surveys of load conditions, power factor, and voltage can only be accurately made with the use of graphic instruments. However, many things can be found by visual inspection, such as broken and hanging insulators, loose trolley wire allowing trolley pole to come in contact with slate, defective lightning arrester installation, accumulation of copper dust on generating machines, poor commutation, etc.

The following costs are for mines which purchase electric power for haulage, cutting, miscellaneous small motors and lighting, using steam-operated hoists and ventilating fans:

Tons produced in sixty days, eleven mines .....	515,519
Kilowatt-hours per ton .....	1.71
Electric power cost per ton .....	4.0 cents
Cost per kilowatt-hour .....	2.4 cents

The highest purchased power cost per ton occurs in mines having mixed power; that is, in mines where only a small per cent of the total power used is purchased. Such mines usually create a high maximum demand compared to energy consumption. This condition occurs when the development of the mine has caused a power consumption in excess of the local generator capacity, thus necessitating the purchase of power during working time, and, in many cases, because of inadequate supply of good water for boilers.

In a coal mine, poor running time and consequent high cost of production is generally due to one of four things: lack of orders, car shortage, labor trouble or failure of equipment. The operator has virtually no control over any of these conditions except the maintenance of his equipment, which makes it important to keep the mine in condi-

tion to operate efficiently when the first three conditions are favorable.

Mr. Harrod said that in no single month in the past three years have all the demand charts of the members of the Indiana Coal Operators' Power Association been absolutely correct. One or two of these charts has always been found wrong.

Graham Bright, in commenting on the remarks of Mr. Harrod, said that the average mine knew little about inspection. In earlier years steel mills and street-railway companies had less complete inspection than they have today. Now they spend twice as much on inspection as on repairs. They do this not so much to save repairs as to assure continuity of operation.

Speaking about bonds, Carl Lee said that he did not believe an over-all test of much value, for you may tell the operator that his return is bad but what is he going to do about it. The Peabody Coal Co. runs individual tests of every bond on main-line track and leaves a mark to show the repair man where the repair is needed. In this way good results have been obtained. The number of bad bonds varies. Some 2 to 15 per cent of all bonds are defective. The bonding gang may finish a section one day and the next day it may go back and find that track switches have been taken up and the bonding destroyed. Mr. Lee said: "We have found that tests made from rail to rail are more practical than any others and that the arc-welded bond is the best. Some have been in four years, and we have never found one defective due to imperfect welding."

J. H. Edwards remarked that he supposed the mines of which Mr. Lee was electrical engineer kept their bonds in perfect condition. In that case the tests from rail to rail were to be preferred. Individual bond tests were the ultimate criterion but he had found by experience that for the average mine with its low-grade bonding system the over-all bond test which gave the average condition of the whole mine was the more valuable. In consequence he had abandoned the bond tester.

#### TAKE OVER-ALL EFFICIENCY TEST

Periodically, or when conditions show that the bonding is deficient, an over-all bond test is made. In case of a converter, it is run with a reduced current and then what the Elkhorn-Piney Coal Co.'s electrical department terms, "a test for efficiency in bonding" is made. By repairing all bonds which were found on visual inspection to be defective, this department has found that the efficiency could be kept 90 per cent perfect.

In one case the general manager suspected something was wrong and notified the superintendent. The latter declared that he believed the bonding was good. Finally a test was made and it was found that the efficiency was only 60 per cent. The bonds were visually inspected and other tests were made and as a result the bonding efficiency was brought up to 95 per cent and the power costs were reduced proportionately.

Mr. Lee said that many of the bonds in the Peabody Coal Co.'s mines were so covered by fallen coal and slate as

to be invisible. He found the quickest way to examine them was with a bond tester rather than with a shovel. He presumed that Mr. Edwards referred to the fact that defective bonds will dry the rail at the joint. He wanted to know how he would detect such bonds where no current passed through the rail. Suppose between the cross bonds there are six joints in one line of rail and among them three or four bad bonds. They prevent the current flowing in that line of rail, and in consequence though they do not heat up they may be extremely defective.

Mr. Edwards remarked that he had used recently a pocket compass as a means of detecting the absence of current. This will show quickly whether one rail is carrying the whole electrical load and the other rail is dead. His experience in six mines in West Virginia and Kentucky, he said, did not include bonds that were invisible except those that were covered by dirt, mud and water. Little satisfaction was obtained with the individual bond tester. He had used the indicator type of tester, also the audible type with the

drill for contact. The latter, however, needed experienced men. He had also tried making a test at the joint but he found that it indicated a good bond when there was no bond whatever.

Mr. Bright said that at one of his mines it was the intention to have all the bonds tested. A crew was sent round and all the bonds were tightened. A high average of bad bonds was found. A good tight plate is essential to a good bond. In one mine a test was made of an average of 350 bonds for a distance of fourteen miles of track. After each 25 bonds examined a mark was placed. Every time a defective bond was found that was marked also. After the whole mine had been examined it was found that 61 per cent of the bonds were defective. After placing some 1,500 bonds a saving was made in the power bill of about 40 per cent. Now the regular bond man makes an inspection during every day that the mine operates. When the motorman sees a bad bond between numbers, say, 50 and 75 of the marking, he reports the fact to the bond man and it is repaired immediately.

## Instruments that Decide Your Fortune

By J. F. MACWILLIAMS

Electrical Engineer, Pennsylvania Coal & Coke Corporation

**I**N THE concluding number of the symposium "Problems of Electrical Men" J. F. MacWilliams, electrical engineer, Pennsylvania Coal & Coke Corporation, addressed the meeting on the importance of having instruments to test the operation of equipment so that knowledge may replace guesswork.

"With competition in the coal industry as keen as in any other field it behooves all engineers to effect every possible saving. First of all, this means that our engineering must be high-grade and that every piece of equipment must operate efficiently.

To obtain these results, nothing is so important as operating data. If our engineering service is to be paragon we must know how present equipment functions, whether it be efficient or inefficient; and if we are going to get the best results from the apparatus which we install we must be eternally vigilant and prompt to prevent or discover wastes.

The first thing we must do is see that the equipment we purchase is capable of doing its work efficiently. Next, we must make sure that the apparatus is properly installed and maintained so that it will be able to do its work effectively.

Unless some definite system is adopted for the testing and inspection, much time and effort and considerable valuable information will be lost. Our company has therefore decided upon and carried into effect a plan whereby every important piece of new equipment is tested before it is placed in service. This survey usually proves whether the equipment is suitable for the work, checks the performance curves, discloses its limitations, determines whether the installation has been satisfactory, and gives us an opportunity to plan better methods.

In our repair shops, we try to test all

repaired apparatus before returning it to the mines. Such a procedure quickly discloses short-circuits, reverse connection, grounds, etc. Our experience in this work has taught us much. When we first started our present method of testing we found that the number of defective field coils in service on electric motors was astonishing. These coils are of so low a resistance that a ten-degree difference of temperature will in many cases affect the usual testing apparatus more than two or three short-circuited turns of wire in the coil, and therefore make it almost impossible to arrive at any definite conclusion.

We believe the only way to test these fields is by a special transformer which we have designed and which is now being built by the Flood City Manufacturing Co. of Johnstown, Pa. This company is also building a bond tester which we have developed.

As we have increased the personnel of our testing department we have reduced our maintenance force. This, to us, is conclusive proof of the wisdom of such a course. As a result of our tests we have become convinced that the protection of motors by overload relays and fuses is unsatisfactory because they cannot give the proper delay. We have concluded, therefore, that if we could procure perfect thermal protection, we could take care of the motor under any condition. Excellent results have been attained by thermal relays for bearing protection, but disappointment has been the result of installing relays intended to protect the coils of alternating-current motors.

Consequently, we are considering the matter of designing a thermal motor protective device and hope to be able to have one for test in a short time. This device will be built on the principal of the Wheatstone Bridge, the galvanometer being replaced by the trip element, a relay now quite common. Two of the branches of the bridge will be made into a rope placed around the coils.

In the field we must first of all ascertain whether the electric motors are re-

ceiving the voltage for which they are designed. If the pressure is low, we are losing not only the cost of the wasted power but also the cost of the excessive labor required to keep the machine in repair. Then again, there is a serious loss due to the fact that the machine does not earn enough to pay for the investment in it.

At each important mine, we have placed Bristol graphic recording voltmeters which are moved around to the different distribution centers, thus keeping a constant check on voltage conditions. If low voltage is found at any center, an inspection is made, and if the trouble is not located at once, tests are made of the feeders and bonds. The man making the test makes the repair again and tests the circuit. Once a year a general test is made of all feeders and returns by connecting overhead conductors and return circuits solidly together at distribution centers and applying sufficient voltage at the substation to produce the average current required. Thus we determine power loss. We have found that though the Bristol meter may not be as accurate as others, still it will indicate the variation in voltage.

Pumping and ventilating require a great amount of power and if a careful check is not made, efficiencies as low as 30 per cent are common and may be allowed to continue. Pressure and vacuum gages give very good indications of the performance of centrifugal pumps and an ammeter in the motor circuit will check the operation of the motor. Upon a pump or fan giving any sign of trouble, a test should be made to determine the cause. A careful test of every important fan or pump should also be made immediately after its installation. The power input to the motor the discharge as well as pressure readings should be taken.

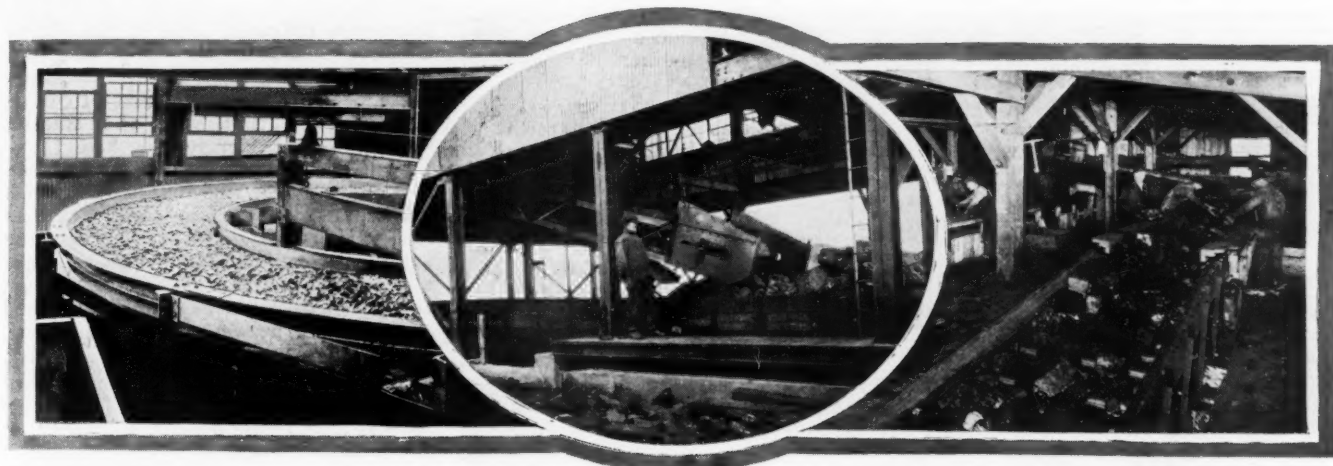
### DON'T OMIT TESTING THE FAN

Fans should be tested under various conditions of speed, pressures and capacity by corrected anemometer or pitot tubes, water gages and thermometers. We make a practice of dividing the section of the airway, where anemometer or pitot tube readings are taken, into not less than 12 parts and use a water gage arranged for various angles of inclination to obtain accurate readings.

For testing locomotives and determining the tractive effort required to haul cars equipped with different kinds of bearings, we use oil dynamometers. In making tests of bearings, a full trip is hauled over a heading having markers established to indicate changes in grade and distance. Drawbar pull multiplied by miles per hour is checked against kilowatt input. The weight of the trip is carefully taken, and the observation car with contents is run over the route at the same speed as the trip. In this way, we are able to determine the power required by the locomotive and observation car."

In discussing Mr. MacWilliams' paper, Mr. Webster said he had designed a bond tester for low current with three rigid sides and one that is hinged and rests on a leg. When a short-circuit is found the tester immediately gives a reading. It is easy for a man to throw in the coil and close the switch.





## How to Clean and Size Coal So That a Favorable Market Can Be Maintained

By Air Cleaning, Ash Is Reduced Between 33 and 50 per Cent—Coal Gets to Market Unfrozen—What Coal Should Be Sized in the Tipple and What in a Rescreen

### Winnowing Coal to Separate Its Impurities

**G**ETTING dry coal that will not freeze in winter, saving much of the clean coal that is lost in wet-washing processes, running the plant in winter without trouble from frost and obtaining refuse running from 82 to 87 per cent were among the achievements recorded by Humphrey D. Smith, general superintendent, American Coal Co. of Allegany County, with mines around the Bluefield district of West Virginia, at a meeting on coal preparation at the American Mining Congress, May 13.

Mr. Smith said that at the plant of the Crane Creek mine, the 185 tons per hour that goes through the 2-in. circular openings on the horizontal shaking screen is carried to the top of the dry-cleaning building, and thence is passed over screens, through bins and over tables to the storage bins alongside the railroad. At the plant of the Wyoming Coal Co. approximately 150 tons are treated per hour. To return to the Crane Creek plant, this is provided with a battery of 36 Hummer screens, and this divides the coal in seven sizes; 2 to 1½ in., 1½ to 1 in., 1 to ¾ in., ¾ to ½ in., ½ to ¼ in., ¼ to ⅛ in., and ⅛ in. to dust. The coal from ¼ in. to dust is bypassed and not treated, but the other sizes from 2 in. down are passed through the cleaning process.

#### STORE COAL OVER AIR TABLES

The coal that passes through the vibrating screen falls into bins of 15 tons capacity, one being placed over each separating table. The bypass coal under ¼ in. is chuted directly under the floor of the table room. The coal from the bins just mentioned is fed by reciprocating units to the feeding ends of the cleaning tables. It has been found that it is extremely important to keep a constant bed of coal on the

table. The provision of 15-ton bins is valuable as a means of steadying the flow of coal to the tables. The Crane Creek plant has been in use approximately a year and has handled 192,000 tons of coal, running from 2 in. down to dust.

In treating the coal the American Coal Co. has found that on the larger sizes it has not been possible to get enough of the coal to properly bed the table. Consequently, it has been obliged to run the larger sizes, those between 2 and 1½ in. and between 1½ and 1 in., intermittently, using the 15-ton bins in which to store the coal until enough has been gathered for the running of the table. The general average of all tests taken indicates that the percentage of ash in the crude coal averages about 10 to 12 per cent. The average ash in the clean coal as shipped in the railroad cars runs approximately between 7 and 8½ per cent, although some samples run better and some worse.

#### ASH CUT IN TWO OR CUT A THIRD

Coal that is shipped includes the bypass coal which is not treated on the tables. The coal actually treated by the dry-cleaning process will run from 4½ to 5 per cent ash up to about 6½ to 7½ per cent. The large-size crude coal runs from 13 to 17 per cent ash, and the small-size coal usually between 9 and 10 per cent, thus it is evident that the ash reduction varies between 33½ per cent and 50 per cent. In the operation of the plant we use three fans. One double 72-in. fan which handles the air from the first two largest sized tables which prepare coal running from 2 to 1½ in. and from 1½ to 1 in. The other half of the double fan handles from 1 in. to ¾ in. and the third fan handles all sizes from ¾ in. down to ⅛ in.

The Crane Creek plant has eight tables in operation. About 100,000

cu.ft. of air per minute is handled through the dust-collecting system. The air for the fans comes from large hatches and passes into two large centrifugal dust collectors placed on the outside of the building.

The American Coal Co. is recovering all the dust except the very finest air float, which would be under 200-mesh. The dust from these collectors is piped, taken over to the clean-coal elevator, where it is remixed with the clean coal in the same proportion as it was taken out. Bypass coal also is added in a similar manner.

The present plant being built into an old wet washer has some six or eight operations that would not be necessary if a new building had been erected. In consequence the power consumption is slightly in excess of what would be good practice. Taking the connected load in the plant as approximately 525 horsepower the consumption of power per ton of coal treated would run 2.35 kw.-hr. Some reductions in that consumption are anticipated as a result of changes made in drives. The officials hope in time to be able to handle a ton of coal with a power consumption of 2 kw.-hr.

#### ABOUT FOUR MEN IN PLANT

In the plant four men are employed and occasionally five. Since the beginning of the year the number of men employed in the building has averaged 4½. In estimating the cost of cleaning this coal a charge for depreciation has been added, and this has been made large because the structure is of wood and may have to be replaced before many years. In round figures the cost of dry cleaning coal at this plant is about 20c. per ton including labor, power charge and plant depreciation. No charge has been added for the loss of rejects, which some might think should be included.

All the coal is sold on the market



Fig. 1—Lump Screens in a Tippel

Thorough screening is a primary requisite of coal preparation. Oscillating screens have almost entirely supplanted those of other types. The perforated plate has also almost completely taken the place of woven wire as a screening medium.

and the loss of this rejected matter reduces of course the product that is available for sale. One of the main advantages of dry-cleaned coal is that it does not freeze in the winter as does the coal from the other cleaning plants of the American Coal Co. which use the wet process. Another advantage in dry cleaning is that the loss of fine coal is at a minimum. The ash in the refuse will average from 82 to 87 per cent, which shows that only a small quantity of coal is wasted in the washery.

#### REFUSE AT CRANE CREEK HEAVY

The refuse has about twice the specific gravity of the coal, and that makes the cleaning problem more or less easy. Another advantage of this process is that as it is dry it is possible to operate the plant when the temperature is below freezing as well as in warm weather. In fact the cold air makes the tables operate more successfully in winter than in summer.

Replying to G. A. Vissac, general manager of the West Canadian Collieries, Ltd., of Blairmore, Alta., Canada, he said that the larger sized screens were extremely effective, because such a small tonnage goes over them. The smaller sizes gave practically no trouble above  $\frac{1}{8}$  in., the screening efficiency varying with the moisture obtained in the coal. Sometimes wet trips that will carry 4 to 8 per cent moisture will come out of the mine and this coal cannot be screened down to  $\frac{1}{8}$  in. In that event fine screens block up and it is necessary to bypass some of the finer coal.

In reply to M. B. Morrow, Canmore Coal Co., of Canmore, Alta., Canada, Mr. Smith said that the dry-cleaning plant is equally efficient with coal from 1 in. to 2 in. as it is with smaller coal, but it is absolutely necessary to have enough of any one size to bed the table properly.

The chairman of the meeting, Colonel Warren R. Roberts, declared that these tables at the Crane Creek mine would handle 240 tons an hour and Mr. Smith

said that he believed the plant could be run at that capacity and give efficient service. The tonnage produced in the past year, namely 192,000 tons, passed through the plant in 170 working days of eight hours.

L. E. Woods, president, American Coal Cleaning Corporation, said that there were two pneumatic coal-cleaning plants in West Virginia, a small one in the far West, one in New Mexico, two tables at Niagara Falls cleaning coke and four tables soon will be working in England. All told there are more than thirty tables in operation with an annual capacity of a million tons.

R. W. Arms, of the Roberts & Schaefer Co., said that air cleaning required more careful sizing than water. Nevertheless it is not absolutely necessary to provide for eight or ten sizes at every cleaning plant. It has been shown that it is possible to select one extremely dirty size and by cleaning that size alone to make an effective reduction in the ash content of the coal. The cleaning of coal involves a shrinkage in the quantity of coal delivered to the market. Each operator should select for himself what shrinkage he is willing to effect in cleaning his coal. He must drive out the dirt with air or wash it away till he strikes a happy medium.

#### DOES NOT PAY TO OVERCLEAN

Coal men had explained to him that the public does not really want an extremely low-ash coal and that if the ash in coal could be reduced till only the inherent ash were left, the coal would not be a good fuel under ordinary conditions as they now exist. Whether or not that is true is a matter for each man to decide, but it is certain that a product having a uniform percentage of ash is more to be desired than one that has an extremely low but variable percentage. It is found that the air-cleaning system produces a uniform ash, which really is a tangible asset.

E. W. Park of the Interstate Coal Operators' Association, desired to know if the same blast of air is used for all

the seven different sizes in the Crane Creek installation. Mr. Smith said that each table has its own air pressure. The blast with the larger size of coal is heavier than that with the smaller sizes. It is heavier for the 1 to  $1\frac{1}{2}$  in. than for the coal larger than  $\frac{1}{8}$  in. and under  $\frac{1}{8}$  in. The four tables which clean the larger sizes take twice as much air as the tables which clean the smaller sizes. After the air is once adjusted to get the needed suspension the air delivery need not be changed for a month or even months at a time.

Mr. Smith in answer to Mr. Woods said that he did not believe that \$15 had been spent on repairs since the tables had been installed. There is nothing to get out of order. A motor bearing on one of the tables heated and it had to be rebabbitted and one of the original decks that came with the tables is still in use. A small hole about 1 in. square had to be repaired where the refuse left the table by which the largest size was cleaned.

However, the air delivered to the tables should be as clean as can be obtained. Otherwise the small perforations will clog, and the decks will have to be removed so that they can be cleaned from the underside. At the Crane Creek plant the air is obtained from intake pipes running perhaps 50 ft. beyond the building. These pipes are 36 in. in diameter. In this manner clean air is provided.

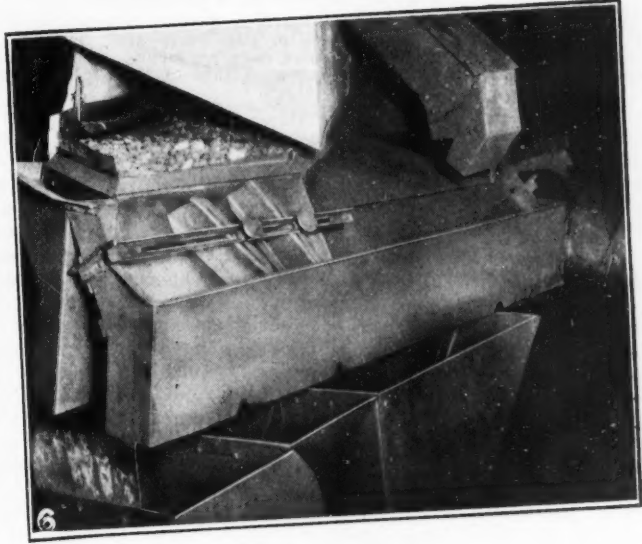
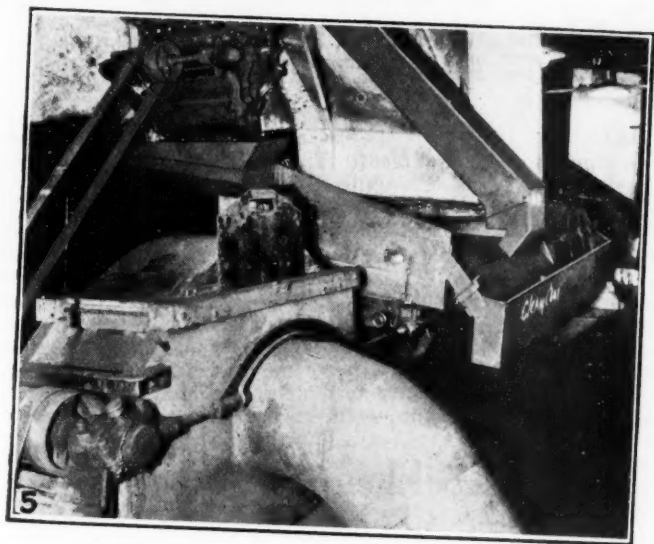
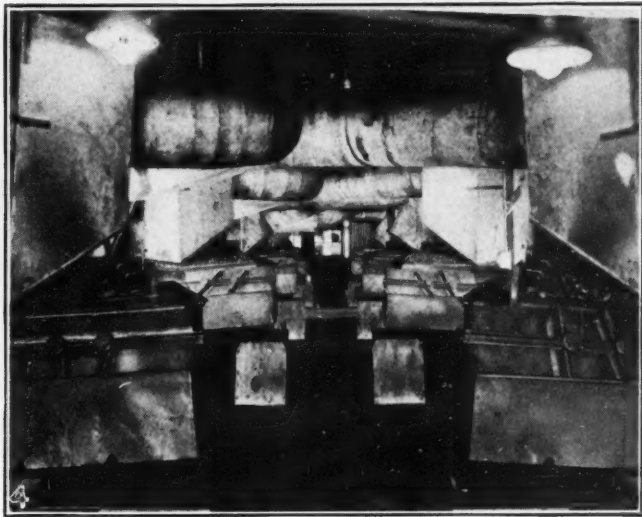
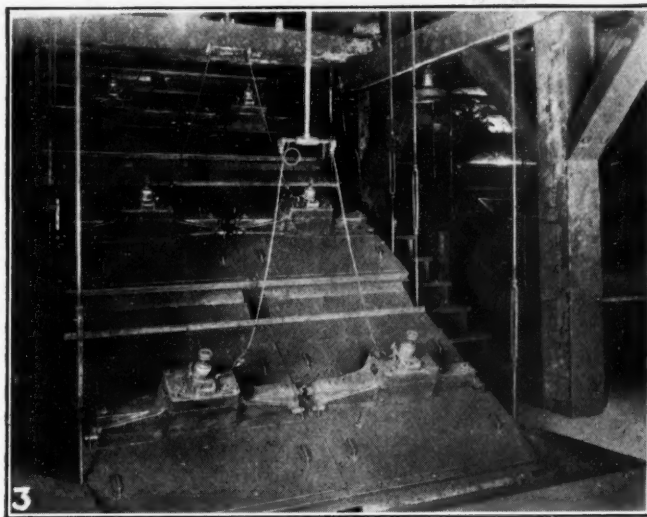
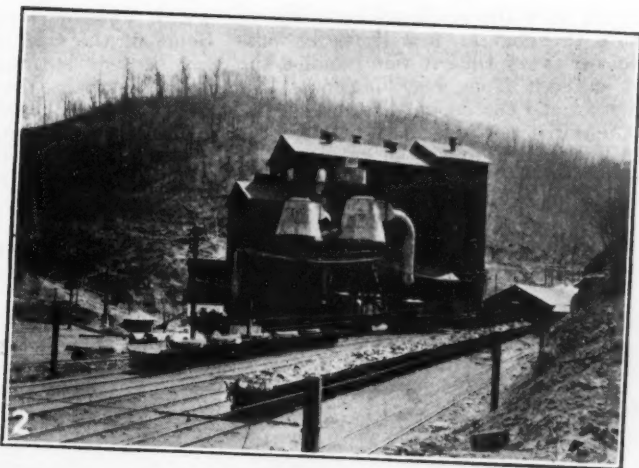
George Delamater, of the W. S. Tyler Co., said that an 8x5-ft. screen would handle 100 to 120 tons per hour when screening  $\frac{1}{8}$ -in. coal. An 8x5-ft. screen requires 1 hp. to operate. A  $\frac{3}{4}$ -in. screen with 20-sq.ft. of screen surface will need one horsepower to drive it and will handle 180 tons an hour. Wet coal can be screened satisfactorily down to  $\frac{1}{8}$ -in. Below that it will give some trouble. In every instance the vibrator must be given enough vibration to handle the maximum load.

#### How Should Coal Be Screened And Into How Many Sizes?

Salesmen too often take contracts which compel a reconstruction of the tippel, causing not only much unprofitable expenditure but destroying the whole design to such an extent that the coal is prepared and loaded with excessive degradation, said G. F. Osler, general manager of the Pittsburgh Terminal Coal Co., in the second half of the session on coal preparation in the afternoon of May 13. Hugh Shirkie, president, Shirkie Coal Co., was not present to discuss the relative claims of preparation in the tippel and preparation by secondary equipment in a separate structure.

In Pennsylvania, said Mr. Osler, picking tables did not become general till the year 1917. In the Pittsburgh district only four sizes are being made—slack, nut, stove or egg and lump coal. For this reason Mr. Osler did not consider a Pennsylvania operator competent to judge whether an Illinois producer should do all his sizing under one roof or erect a secondary building in which to do the rest of the work nor where a line should be drawn between the two.





#### Scenes at the Crane Creek Mines, American Coal Co. of Allegany County, McComas, W. Va.

Fig. 1—Tipple and dry-cleaning plant. Tipple, boom house and dump in front, dry-cleaning plant in rear. A large inclined elevator takes raw coal under 1-in. diameter up to cleaning plant from tipple. Fig. 2—Rear view of dry-cleaning plant. Note the five-track yard for mine cars feeding to dump house, the two large dust collectors and fans taking dust from the screens and cleaning tables. Fig. 3—Vibrating screens set in two batteries. View shows three 8-ft. screens having two vibrators for each screen. The plant has twenty screen units with thirty-six vibrating sections. Coal passing over and through these screens goes in bins over the cleaning table floor.

Fig. 4—Cleaning table floor with eight tables. Starting at front, first table at right treats 1½- to 2-in. coal, first table at left 1- to 1½-in. coal, second table to right ½- to 1-in. coal; third table, right and left, ¾- to 1-in., fourth table, right and left, ¾-in. to 1-in. coal. Big hoods over each table with large air pipes take air and dust off tables to fans located outside the building. The discharge from the tables includes three separate products—clean coal, middlings which are run over the tables a second time and refuse. Chutes take this refuse to conveyors under the table floor. Fig. 5—Rear of cleaning table showing

fresh-air intake pipe to fan built in table. The valve permits the intake pipe to be closed thus allowing the attendant to control the quantity of air supplied to the table deck. Note that the eccentric drive for oscillating the deck of the table has cone pulleys for varying the number of strokes per minute. Fig. 6—Back view of cleaning table showing discharge from table deck. Movable flights allow changing cut between clean coal, middlings and refuse. Note the hood for the dust collector above the table. The chute above the table leading from the steel bin makes it possible to bypass coal whenever a table needs repairs, thus enabling plant to run.

In his view the principal need was to handle the coal as few times as possible, for every time it was handled the coal suffered from degradation. "The salesman and customer," said Mr. Osler, "are against the operator because the salesman will promise the customer almost anything he asks. He often asks us for a separation of sizes for which we are not equipped." The engineer in designing the tippie builds it to satisfy the requirements of the operator as

weigh basket without degradation. Some of the coal is passed over shaking screens but some still is sized on gravity screens, though that is regarded today as antiquated practice. Most of the operators, engineers and tippie builders do not seem to realize that mine-run coal will break. Where shaker screens are used, the shape of the screens determines in large degree how much slack they will make and how much slack they will remove.

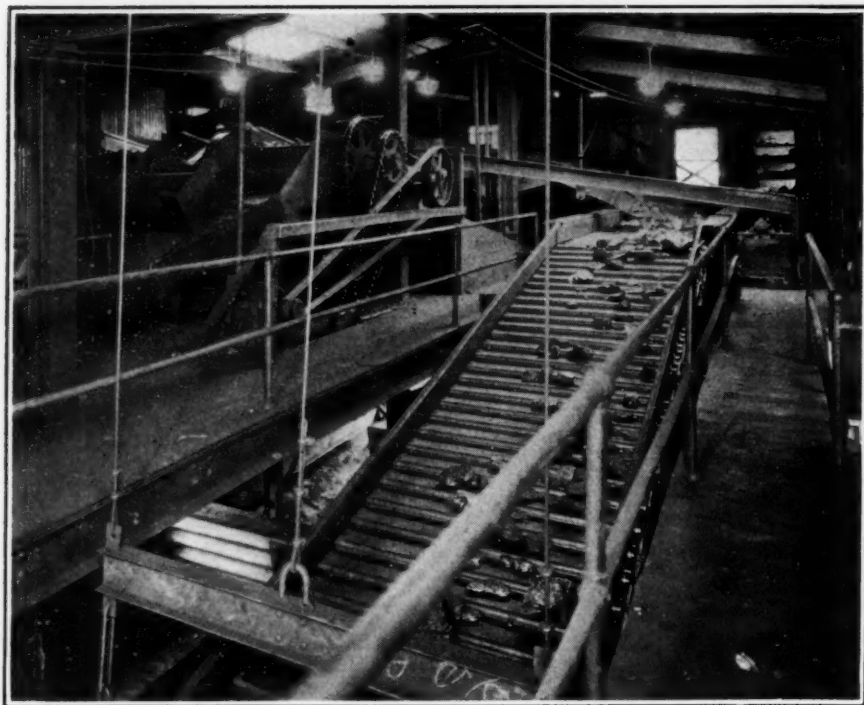


Fig. 2—Interior of a Bituminous Tippie

At many mines four sizes of coal are prepared. Two and sometimes three of these are hand picked on travelling apron or pan conveyors. The two larger sizes also are usually lowered carefully into railroad cars by means of either loading booms such as that here shown or by shaking chutes. Either of these devices may be lifted clear of the car when not in use loading coal.

they have been detailed to him. No sooner is the structure completed—even before it is completed—than the operator finds he wants "to do some stunt with the coal."

The salesman has been busy trying to get the operator to accept a contract having a freak specification. The operator has assented and has cavalierly remarked "We'll fix that. Our engineers will work it out." They do—by dropping the coal some 7 or 8 feet. If operators would take a moment to consider the breakage of coal after screening they would not ask the engineers to handle the coal in so many ways without the use of conveyors. The tendency is to make the primary screening of the coal the only operation.

Coal should always be slid and not dropped. All chutes should be covered from the screens to the point where they discharge into the car, as the quantity of dust which is blown from the chutes is worthy of consideration. Around a tippie where the chute is not covered by a housing, slack can be found covering everything with a thick coat. The immense quantity of dust in the air is far from healthful for the men working on the picking tables.

In the Pittsburgh district little attention is paid to getting coal into the

In a recent investigation Mr. Osler found that of the nine tippies of the Pittsburgh Terminal Coal Co. equipped with shaking screens, hardly two screens, though they were all of the same type, would screen the coal alike. Wet coal would stick to nearly every type of screen. The best screening medium for wet coal was a screen having a step 6 in. long with a 2 in. rise and not a long sloping screen. He found that the 12-in. steps would become wedged with small pieces of coal and that the wet coal would ride over them. He also found that some of the screens had been so arranged that the coal became worn in passing over them, thus increasing the percentage of slack.

Warren R. Roberts, the chairman, said that in Illinois, where seven sizes of coal are made and the operator desires to put in only a four-track tippie, it is necessary to erect a resizing plant to handle those sizes that cannot be separated in the tippie. This question presents itself: What sizes should be handled in the rescreen plant and which on the main screens? Some plants have been designed so that only the lump and egg were loaded directly under the tippie. No coal should be rehandled that can be sized in the main building.

Frank E. Young, of New Mexico, said that in that state five sizes were made

at the tippie, but he thought that if a sixth size were made it should be taken out by a different separation. The smallest size prepared (1½-in. to ¾-in.) is made at the tippie and is loaded out there. The lump, egg and nut are loaded by booms but the pea coal, which is 1½ in. to ¾ in., is loaded out by a curved chute crosswise of the car. Mr. Young said that lump coal sold for \$4, No. 1 nut and egg for about \$3.25, pea coal for \$2.75 and slack for \$2.25, so there was large saving wherever coal was not degraded.

Mr. Roberts said that Illinois was preparing altogether too many sizes of coal and that he had always endeavored to oppose the installation of machinery for such excessive preparation. He agreed with Mr. Osler that the distant salesman often reported that he had sold a quality of coal that the plant was not designed to deliver and that the engineer was asked to redesign a plant which had been working successfully. This rearrangement ruined the tippie as far as the handling of the coal over the primary screens was concerned. If a company has a plant that satisfies 95 per cent of the orders, it should not be ruined to please the other 5 per cent. The operator should let some other fellow cater to that small percentage. Suppose seven or eight sizes are made and there is a market for only five or six, what is going to be done with the other two? It would be well for operators to reduce the number of standard sizes.

Mr. Tracy remarked that on Jan. 26 in a certain district of Illinois of unbilled cars there were eight of lump, nineteen of egg, forty-six of nut and 192 of slack. The operator is certainly in difficulties when he has only eight cars of lump left to 192 cars of slack. How can he operate profitably, manufacturing such a large quantity of distress coal?

Mr. Smith said that at some portions of the year conditions would be reversed. The demand for sizes was changing owing to the installation of different kinds of boilers. For a while the old-fashioned boilers that could not burn the finer sizes were still in use, but of late years as these boilers played out they were replaced by others that had grates that could burn the finest sizes. Furthermore, all the entirely new installations were of that character. The tendency was toward buying finer sizes of coal.

### Industrial Co-operation Lunch

On Thursday, May 15, the American Mining Congress canvassed the subject "Industrial Co-operation" with Harry N. Taylor, president, U. S. Distributing Corporation and Sheridan - Wyoming Coal Co., presiding, and F. W. Smith, F. P. Wright, Lee Lang and Carl Scholz as speakers. The latter showed a cube of oak wood, a cube of coal and a stick of gum, all of which sold for a cent. The cube of oak measured 2½ in. each way, that of coal 6½ in. The coal weighed over 10 lb. and had locked up in it the power of producing 174,000 B.t.u. Mr. Scholz remarked that no wonder the Wrigley Building based on the gum industry was one of the finest in Chicago.



## Congress Wants to Do What Is Right But Is Looking for Counsel

Callbreath, Brydon, Parker, Gandy and Moorshead Discuss  
Present Position of Coal Industry—Congress Not  
Wrongly Purposed but Often Ill Advised

THE "Get-together" dinner on the second night of the Congress and the night before the National Coal Association began its convention was something more than fried chicken and a succession of funny stories and high-sounding but hollow phrases about co-operation. Some earnest words were spoken in an effort to convince the whole coal industry that there is real necessity for it to get together.

It must get together to combat the rising tide of socialism that is leading toward too much government control over business, J. F. Callbreath, secretary of the Congress, declared. He warned, after his long experience in Washington, that the pressure for legislative supremacy over the judicial is powerful and that real effort must be exerted to stop it.

As for Congress, whose action with regard to coal has long been viewed with alarm by the coal man, he declared that although our national legislative body has been strongly condemned from many sources, yet it is truly representative of the best thought of the nation and that many of its mistakes have been due to inability to get the right viewpoint on the matter in hand. It only needs to have a just cause properly presented in order to do the right thing, Mr. Callbreath thinks.

It is the right thing for the coal industry to adopt an attitude of "sensible selfishness," he said, and to campaign for the things to which it is justly entitled that it may exercise the great American privilege of working out its own destiny. If it gets that, it will prosper and the public will benefit.

The way for the industry to get together and pull itself out of the muck is not by legislation nor yet by consolidation of finances or salesmanship, said J. C. Brydon, president of the National Coal Association, but by a consolidation of thought and effort.

### DAY OF SHARP PRACTICE ENDS

"The time has passed," he said, "when sharp practice or mere shrewdness will win any man permanent advantage over the rest of the industry. The most we can hope for now is to raise the general average benefit and enable it to flow to all."

He took the customary crack at the work of the U. S. Coal Commission, inviting anyone to point out a single commission remedy for the ills of coal. He said that the National has been making some use of part of the great mass of information gathered during the time of the commission's life, however, and that some benefit is being derived therefrom. It has aided the National in its successful efforts at Washington to prevent the passage of a mass of foolish legislation.

The battle of prevention goes on day by day against both friends and enemies, he said, reciting his experience with a friend—Senator to illus-

trate the point. He dissuaded this Senator from introducing a coal bill even though the Senator honestly wanted to benefit the industry.

"If that's what you want," said Mr. Brydon, "then don't propose it. The best thing for the industry is to be let alone. Whenever it has had the opportunity to operate unhampered it has furnished the public coal when and where it was needed and at a price lower than that of the product of any other industry."

"But," said the Senator, "if something like this isn't passed, the bolsheviks will pass something worse."

"Then let them pass it," replied Brydon. "If they have that much strength, then your bill, even if enacted, wouldn't last long on the statute books. The thought of this country is revolving in such swift cycles nowadays that if bolshevik coal legislation becomes law it will wear itself out in four or five years anyhow, and we will be through with it. So the best thing to do is withhold your bill."

It was withheld.

Mr. Brydon was optimistic about coal even though the industry is at a low point. The fact that Cincinnati had drawn together the greatest assemblage of coal men the industry had ever marshalled in one place at one time made

him think that "in spite of our condition, the spirit to do is with us."

E. W. Parker, director of the Anthracite Bureau of Information, humorously met Mr. Brydon's challenge to "point out a single commission remedy." He said that the commission plainly recommended on one page that the bituminous-coal industry eliminate brutal competition as the anthracite industry had done, and on another page, recommended that the anthracite industry go back to it again. In serious vein, Mr. Parker said that the coal industry must educate the people, difficult though that task seems. The anthracite industry is getting real results in its present campaign to show the public how to burn hard coal more economically.

The sound message of Harry L. Gandy, secretary of the National, was this: Coal problems will certainly be solved in the coming years. They will not be solved by legislation or by the appearance of some Moses of coal but in the everyday life of the men in the mines and the men in the business offices of the industry. His message was heard by an audience that listened to every word and applauded him heartily.

A. J. Moorshead, veteran Illinois operator and president of the Madison Coal Corporation, made an appeal for stronger organization among operators even in regions where conditions seem widely variant. In such cases, as in his own state, he urged that at least the officers of all the groups be associated so that the producing regions of the country could be bound into as strong associations as possible.

## How to Get Lump Coal in Place of Slack

Adams Tries Union Co-operation and Instruction—Allais Wants Miner  
Paid on Similar Basis to Operator—Hatfield Relates a Return  
to Lump Scale and 6 per Cent Reduction of Screenings

AT THE close of the dinner on Tuesday a session was held to discuss the methods of blasting coal which would afford the largest percentage of lump coal. N. S. Greensfelder, presiding, read a paper written by H. C. Adams, of Chicago, president of the Peerless Coal Co., operating in the Springfield district of Illinois. At the Congress a year ago Mr. Adams led discussions on this same problem, and since then has attempted to carry out some of the ideas that he formulated at that meeting.

The Adams paper described the campaign of education that has been carried on by the Peerless company to get shotfirers to do their work properly. It has been productive of only meager results but still enough to convince Mr. Adams that such an effort is well worth while. It will be carried further.

He first sounded out the union labor officials and found that they were willing to back him up in enforcing that clause in the labor contract requiring the men to shoot the coal in such a way as to produce the lowest proportion of screenings. Then he chose some of his best men to instruct the others, and attempted to follow it up. A few miners were discharged for failure to



Not All the Slack Is Mine Made

Long conveyors often add to degradation. The handling at the tippie, however, frequently without conveyors, is far more harmful than any such transportation. The work of eliminating slack should start at the face and be followed painstakingly to the railroad car—a trip any superintendent might make with advantage, visualizing on the way the tribulations of a lump of coal.



Car of Straight Creek Coal from Bell County, Kentucky

This product is evidently screened coal. There is no really large coal among it but what of that? Large lumps have to be broken to smaller size by the consumer and he thus gets slack which he has paid for as lump.

co-operate. But on the whole the benefit was only temporary.

The overshooting of coal, he thinks, is the operators' fault for previous failure to enforce the contract and to give miners proper instruction. Education is the only way out. He blames solid-shooting operators for not making careful studies of their coal structure so as to determine best shooting methods.

Some concentrated effort in the East is being made to improve shooting methods. It was described by J. E. Crawshaw and C. W. Nelson, of the Bureau of Mines. Exhaustive experiments were made at the Naomi mine of the Hillman Coal & Coke Co. all winter as a co-operative effort between the Carnegie Institute of Technology, the Bureau and the Hillman company. It was shown conclusively that the percentage of lump passing over 1½-in. bar screens in that seam could be raised as much as 7½ per cent and powder consumption reduced 30 per cent. The tests will be described fully in *Coal Age*.

In the discussion of blasting that followed, A. L. Allais, president of the Columbus Mining Co., operating in Indiana and Kentucky, said that while education of miners of course would help a little, it still would be human nature for them to shoot coal down in the way that would reduce their own labor most, and therefore something further is necessary. He believes scales of pay should be changed so that lump shall be loaded out at one rate and screenings at a lower rate.

"That," said he, "is precisely the way the public pays the operator. What is good for the operator ought to be good for the miner."

J. S. Hatfield, of Cincinnati, interested his hearers by telling of a mine

in a non-union field that had actually gone back to a straight lump basis of pay a short time ago. The result at once was that 1½-in. screenings dropped from 40 to 34 per cent.

Shooting for machine loading was discussed briefly by W. J. Whaley, of the Myers-Whaley Co., of Knoxville, Tenn. For machine loading the whole face should be shot down at once so as



Pocahontas Coal on Deck of Ship at Lambert's Point Pier

This coal, like most low-volatile fuel, is friable though not as much so as is other low-volatile coal. As it is used for stokers its fineness is no fault. However there is plenty of larger-size material should it be desired to use it as a substitute for anthracite.

to give the machine as few movements from place to place as possible. Of course, this means a disadvantage as compared to hand-loaded mines where one end of the face can be shot down first and loaded out, leaving an open end which reduces the percentage of screenings for the next shot. To overcome this, he suggested the use of an air snubbing wedge with which the snub cut could be made without making much "bug dust." He proposed that the machine loader mine be organized so that all drilling and snubbing be done by two men working ahead of each machine. It always pays, he said, to delegate such work to a specified pair of men so that they may be held responsible for it.

## Gas Proves to Be an Active Rival of Anthracite

By W. M. CARPENTER

Engineer, Empire State Gas & Electric Association

Anthracite is steadily increasing in price and at the same time declining in quality. Following long years of steady prices, where domestic coal continuously sold around \$5 at the New York harbor piers and the average price at the mines was under \$4 a ton, the upward climb began in 1916 at an average increase of 18 per cent each year, so that now the price of domestic coal stands above \$9 at the mines and retails at New York in the neighborhood of \$15.

### SHOWS LARGE RATE OF INCREASE

Of all the multitude of articles listed by the U. S. Department of Labor no other commodity in this country has shown such a continuous and extravagant rate of increase as have domestic sizes of anthracite, and the end is not yet apparent. Coincident with these strides in the cost of hard coal a similar increase has been manifested in the use of manufactured gas for heating. The curves of the retail price of anthracite and the domestic consumption of gas show a parallel which is little short of uncanny.

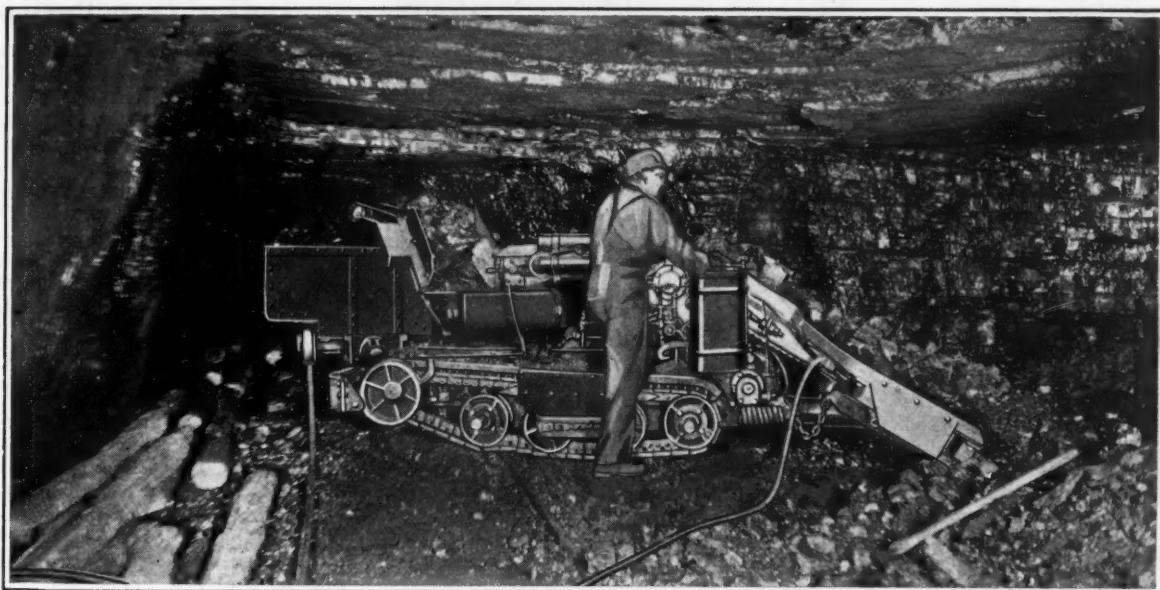
In 1910 the per capita use of anthracite in New York State was 1.75 tons a year and the consumption of gas 6,500 cu.ft. In 1923 there was a 94 per cent rise in the price of coal over 1910 and a 95 per cent increase in the use of gas. The annual per capita use of anthracite has now dropped below 1.50 tons where gas consumption per capita has risen to over 10,000 cu.ft. It has been estimated that the 75c. added to the retail price of hard coal because of the "settlement" of last September's strike will automatically sell—without any effort whatsoever on the part of the gas companies—over 7½ billion cu.ft. of manufactured gas in New York State alone.

Abstract of address delivered at the Binghamton meeting, the Empire State Gas & Electric Association.

### Allowable Sweep in Wood Poles

Length of Poles, Ft.	Maximum Sweep, In.	Length of Poles, Ft.	Maximum Sweep, In.
30	10	55	11
35	10	60	12
40	10	65	13
45	10	70	14
50	10		





## What the Mechanical Loader Can Do and How It Has Been Brought to Its Present Perfection

Loading Machine No Longer Experimental—All Machines Succeed Only in a Mine Slightly Changed to Accommodate Them—Record of Pocahontas Fuel Co.—Dangers of a Premature Scale—Sizing and Cleaning Problems

### Record of Advance in Mechanical Loading

"COAL companies," said Howard N. Eavenson, chairman of the meeting to discuss "Correlation of Mechanical Loading with Haulage and Mining Systems," "seem to think that the inventor of loading machines should develop equipment that would step into the coal mines and do its work without making any change whatever in the methods and organization hitherto in use." Mr. Eavenson estimated that there were about twenty different kinds of loading machines that had been used at some time or other and which had reached various stages of development. Three, at least, of these have been used on a commercial scale.

Mr. Eavenson recalled how difficult it was to introduce the electric locomotive. The roads were built for mule haulage, and operators thought the electric locomotive should be able to use the same weight of rails, the same size ties, the same roadbed, and roadways as crooked as were customary with mule haulage. But in this they soon were disappointed. The new transportation machine had first to revolutionize tracks and roadways. He said that in his opinion the loading machine was about as well-developed as was the shortwall undercutter some twelve or fifteen years ago. The mechanical loader was ready to do its work, but the mine had not yet been adapted to its operation.

D. J. Carroll, chief engineer, Chicago, Wilmington & Franklin Coal Co., said that the history of coal-loading ma-

chines dates back to about 1905, when Mr. Hamilton of Columbus, Ohio brought out the first elevator conveyor type of loader. At that time J. Elwood Jones was working on a loader which is still operating.

In 1908, the Myers-Whaley Co. introduced its machine which loaded out coal successfully. The coal-mining fraternity was not at that time ready for a loader; a contractor wanted to muck tunnel rock and observing the loader in operation, he introduced it into the contracting business. Since then these loaders have been used extensively in connection with big tunnel work.

In 1912 the Jeffrey Manufacturing Co. brought out the entry-driving machine. Its first application, as far as Mr. Carroll knew, was in Old Ben No. 9 Mine in the southern Illinois field. It operated there only a month, and owing to mechanical defects it was not altogether successful. In 1918 it was used in Valier, Ill. and was found quite satisfactory, but had to be abandoned owing to trouble with the Union. No satisfactory rate could be obtained for its operation. Carl Scholz used the machine later in West Virginia with more success.

In 1920 the Chicago, Wilmington & Franklin Coal Co. bought a Joy shovel but held it a year till Orient No. 2 came into service, fear of labor difficulties making it advisable not to introduce it in Orient No. 1. Several more Joy machines and three Myers-Whaley shovels were purchased later, and they have been in operation loading each day 1,200 tons of entry coal in eight hours.

The records of the company are not

as yet satisfactory, for the machines cannot be worked more than 50 per cent of the time owing to switching delays, lack of track facilities and time lost waiting for shots. Nine Joy and four Myers-Whaley loaders are now in operation. Though the machines have not exhibited how much they can load, they have been extremely valuable, for with them 100 per cent more entry has been driven than could have been done with hand loading.

In response to W. L. Robinson of Cleveland, Ohio, Mr. Carroll said that no labor scale had been established. The scale in Illinois is based on the rate paid in 1913 when the Jeffrey entry-driving machine was introduced into the Old Ben Mine, which is \$8.54 a day. The rate is being discussed with the United Mine Workers and it is expected that a scale ultimately will be fixed. No tonnage rate has been set. All men operating the machines are paid by the day.

J. F. Joy, on being interrogated, said that there were 200 Joy loaders in use, 16 in Illinois, 30 in Indiana, 20 to 25 in west Kentucky and the rest located in the prairie country. None are in Tennessee or Alabama, but they are working in the Rocky Mountain Coal Fields, in Pennsylvania, western Kentucky and Ohio. Mr. Whaley said that the Myers-Whaley company had about 40 machines in the coal mines. Asked as to the saving effected by the operation of his machines, Mr. Joy said that the only knowledge he had was from an operator in West Virginia who claimed that he could load with his Joy

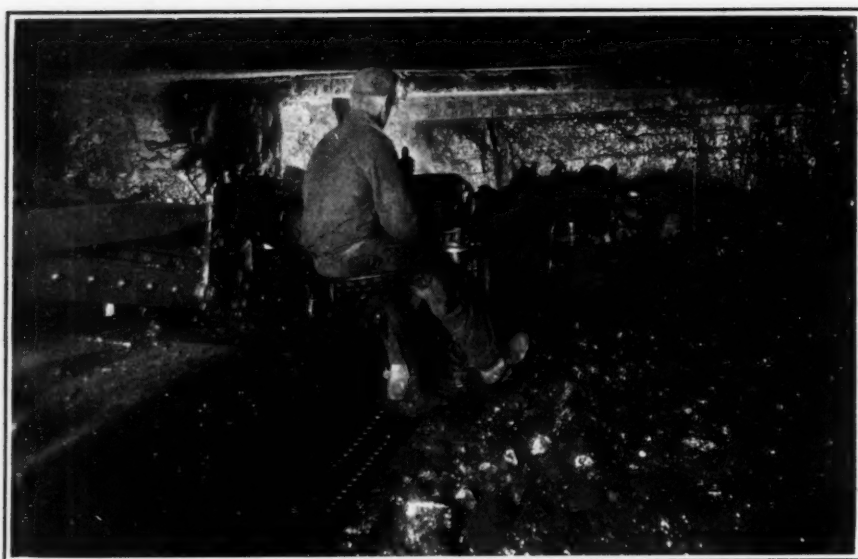


Fig. 3—A Large Shoveler at Work

Shoveling machines will do much to increase the size of mine cars as it takes no longer to shift a big car than a small one. Best work will be done by a mining machine when a whole trip can be loaded without uncoupling a car of the locomotive. Room and pillar mines may be so laid out as to accomplish this result. This permits the machine to work a large percentage of the time and secures large output from a small area.

loader at about 30c. per ton less than by hand loading. This was based, he believed, on the 1920 wage scale.

W. J. German said that the Pocahontas Fuel Co. had 23 coal-loading machines and last year loaded 998,000 tons by machine. At Big Branch the company has three machines which among them loaded 1,100 tons every day. It is having less trouble with its loading machines than with its main-line and gathering locomotives, which speaks well for the construction of the machines. The company's figures show they have less accidents per 1,000 tons loaded by machines than they have with hand loading. At the mine mentioned there are no miners, all the work being done by machine.

For the last two months they have had machines at work that are only 44 in. above the rail. The mine is run by room-and-pillar, one car being loaded at a time. The machine used is the "Coloder," made by the Coloder Manufacturing Co., Columbus, Ohio. The only coal company using them is the Pocahontas Fuel Co. It mines the Pocahontas No. 3 seam which runs at this plant from 6 to 7 ft. thick and has the usual parting which has to be removed.

#### Drawslate Does Not Prohibit

There is also a drawslate running from 3 to 10 in. thick. This has to be brought down and removed before the machine begins to load. Fortunately it is not found everywhere in these workings. In most places it comes down with the coal when shot. Success has been obtained largely because the company is determined to make the machines successful. Mr. German added: "The company must be sold on the idea before the machine will be a success."

R. A. Walter, consulting engineer of New York City, said that a series of observations on these machines showed a daily average of 585 tons for one machine, the test extending over several months. Mr. German added that Mr.

Jones had said to him that anyone who wanted one of his machines could have it by paying for it. The company has been working for fifteen years developing this machine and they believe it is still far from its ultimate development. They are building now solely for their own use, but anyone who wants one can purchase it.

#### Only One Man Has Been Injured

Mr. Eavenson said that he had been informed that up to about a year ago only one man had been injured when at work at the machines since they had been installed. He added that the company had been getting more and better coal from the pillars with the machines than by hand. They were able to do this because they excavated the coal more rapidly than could be done by manual methods. This, Mr. Eavenson believed, was true of all machine loading because a machine can do, in an hour as much as two men in a whole shift. In consequence when in a dangerous place the coal can be withdrawn so fast that the roof breaks where it does not endanger the men and timbering does not have to be done so frequently.

Mr. Smith, of the Illinois Coal Corporation, indorsed Mr. German's insistence on the importance of having the coal company back of the machine. He hoped, however, that in their anxiety to get the mechanical loaders working satisfactorily, the officials of the coal companies would not make unfavorable working conditions that could not be broken throughout the life of the industry. Years ago the meager performances of the earlier mining machines set the rate for those which followed. The shortwall undercutter has been introduced since then and so have arcwall machines. However, they have never achieved as much for the industry as they might have done, for their production has been restricted to the performance of the earlier breast machine.

## Where Loading Machines May Defeat Their Purpose

SEVERAL loading machines are idle, said Thomas F. Downing, Jr., general manager of the Logan County Coal Corporation, because the operator forgot that he would have to clean his coal and would have to obtain salable sizes, and the loading machine prevented him from doing this effectually. The fault is not with the machine but with the operator who failed to give proper consideration to this problem and chose the wrong machine for the particular seam he had to market.

One may save 20c. in the cost of loading, but the advantage thus gained must be obtained without losing that 20c. by decreasing the percentage of lump and egg which is produced for the market. The relative percentage of large sizes may readily be decreased 10 or 15 per cent, and if that occurs the operator has lost in one way what he has gained in another. Preparation begins at the face where the coal is shot down and even with the undercutting that precedes the shot.

Many operators have laminated beds of coal and cut in different parts of the seam. They may cut right under the lamination and pry the lamination loose and then load the upper bench. If they are going to use a loading machine they will have to satisfy themselves that they can find one that will load out the coal as it is loaded out by hand before they invest in such a machine, or they may find that they are unable to keep the impurities out of their product. Mr. Downing said he knew of no machine on the market that would do that satisfactorily.

When loading machines are used the operator must shoot down the whole seam. When he does that he is in dire trouble. Some manufacturers declare that with their machines the coal can be cleaned inside the mine. Perhaps some picking can be done underground, but most of it will have to be done above ground, and it will be necessary to provide the equipment to haul the impurities to the surface, separate them on the tippie and dispose of them when they have been separated.

Before deciding whether you can afford to load the refuse you have in the mine with the coal, pick out four or five places in the mine, have them shot in the same way they will be shot for machine loading, bring the coal out in the cars with the impurity it will contain when so loaded, run it over the tippie, have extra hands to pick it and wash it. Then you will be able to tell whether it is practicable for you to use machinery for loading your coal. Your tippie may be run intermittently and by storing your coal and running the picking tables slowly you may be able to clean the coal without new equipment or more men.

Some have said that if you break up the coal loading it mechanically, prepare more sizes, but one of the curses of the anthracite field is the number of sizes. I don't think the bituminous field should make the mistake of introducing such meticulous sizing into its market, which in most parts of the country is still free from it.



# What Will It Cost and What Must Be Done to Keep Coal Mines Free from Dust Explosions?

Bright Claims Five Tons of Dust Should Be Distributed per Mile—Deike Says 1.8 Tons Will Serve After Roads Have Been Once Treated—Fear's Shale Costs \$3.70 per Ton

THE Friday afternoon session of the Cincinnati Exposition meeting, which George S. Rice termed "the first national gathering entirely devoted to rock dusting," was attended by about 150 men. John E. Jones, safety engineer of the Old Ben Coal Corporation, as chairman of the meeting, had suggested that the discussion of all papers be saved until last.

J. W. Paul was unable to be present, but he presented a paper on "Occurrence, Characteristics and Behavior of Coal Dust," which was read by Graham Bright. John E. Jones read an address entitled "Actual Experiences with and Tried Methods of Applying Rock Dust."

George Deike, president of the Mine Safety Appliances Co., read a paper on "Methods of Procedure," by John T. Ryan who was not able to attend because of sickness developed while aiding in the exploration work in the Benwood mine. A comparison of the inefficiency of water and the effectiveness of rock dust as means to prevent the propagation of coal dust explosions was made by Edward Steidle, supervisor of the Co-operative Mining Department, Carnegie Institute of Technology, in a paper on "Rock Dust vs. Water." Finally George S. Rice wound up the presentation of the problem by talking on the "Co-operation of the U. S. Bureau of Mines," in which he reviewed the past work of the Bureau and suggested what might be expected of it in the future.

## BRITAIN'S MINES ARE DRIER

Mr. Rice pointed out the differences between the mines of this country and those of Great Britain, which influenced the latter country to go to rock dusting. Generally speaking the English mines are drier than ours, for which reason much water was required to hold down the dust. The application of water in large amounts to roof and ribs of the English mines caused spawling, with the result that the mines were rendered dangerous.

He advises every operator to experiment with rock dust to determine the best procedures to follow and to find out the relative cost as compared with that of sprinkling or humidification. Mr. Rice believes that in practically every case rock dusting will cost less than thorough watering.

Mr. Rice sees in mechanical loading the elimination of one of the biggest factors in the origin of coal dust. Mine cars loaded mechanically will not be cribbed high above the sides, to cause the spillage of coal by irregularities in the track or in the movement of a trip. Rock dusting does not remove entirely the necessity for the use of water, for

the latter should be used as an added safety measure in sprinkling trips and wetting down that part of a face in contact with the cutter bar of a cutting machine.

The U. S. Bureau of Mines has co-operated in the past by assisting individual companies, notably the Old Ben Coal Corporation, in testing and analyzing samples of coal dust and offering its experiences otherwise in the solution of problems relative to rock dusting. The Bureau is ready to aid any or all companies in applying rock dust and requests that its advice and service be sought.

L. P. Tracy announced that the Illinois Geological Survey is getting out a bulletin on the location of limestone measures in that state. This bulletin will be ready for distribution in a month or two; all those desiring a copy should write to the experimental station at Urbana, Ill.

## WETTING IS MORE EXPENSIVE

Graham Bright took issue with some of the figures contained in John T. Ryan's paper. For instance, he said that Mr. Ryan appeared to be entirely too optimistic in saying that limestone dust in small quantities can be produced at \$1 per ton. The cost given for applying the rock dust also seems low and therefore the total cost of 0.44c. per ton of coal mined is hardly sufficient, according to the remarks of Mr. Bright, who based his remarks on conjecture alone. He is satisfied that if the cost of producing and applying rock dust is not more than 1c. per ton of coal mined, operators will be willing to adopt rock dusting. Certainly the average cost of wetting and humidification is greater.

The quantity of rock dust to be distributed, 1.8 tons per mile, as suggested by Mr. Ryan, did not meet with the approval of Graham Bright, who said that John E. Jones recommends 2 lb. of rock dust per linear foot of entry, or about 5 tons per mile. Mr. Bright closed his remarks by hoping that compensation rates will be reduced for all mines using rock dust. A reduction of this sort would be an impetus favoring the adoption of rock dusting in other mines.

George Deike answered several of the questions raised by Graham Bright. He said that the charge of \$1 per ton for crushing limestone to dust is based on the employment of no extra labor aside from that expended on a part time basis by regular outside company men. The quantity of 1.8 tons per mile represents the average quantity of rock dust required in each application when dusting is done systematically and at regular intervals.

Thomas Fear, general superintendent of the Inland Collieries Co., briefly stated his experiences with rock dusting extending over a period of three months. The Indianola mine has a capacity of 3,000 tons of coal per day. Entries and crosscuts total about 64 lineal miles. The usual rule is to apply 2 lb. of rock dust per lin.ft. of entry. Two men can apply about 4,000 lb. of dust per hour or 14 tons per shift, over a distance of 14,000 lin.ft. Shale taken from the roof of his mine is crushed on the job at a cost of \$3.70 per ton (not \$1 as given by Mr. Ryan). Mr. Fear believes that the total cost of applying rock dust per ton of coal mined will be no more than 4c. He expects to get credit for rock dusting in his compensation rates.

Experiments in the application of rock dust in the Indianola mine proved to Mr. Fear that with the particular types of distributing machines used (two kinds, fan and compressor types) the end of the nozzle should be held from 20 to 36 in. from the surface to be coated with rock dust. There is a definite relation between the characteristics of the distributor and the distance that the nozzle is held from the surface to be coated. An experienced nozzle man can apply a coat of rock dust to roof and ribs as much as 1/2 to 1 in. thick.

The desirability of heavily coating the ribs and roof was pointed out by Mr. Fear. He said that the floor represented approximately only one-fourth of the periphery of an entry. Though most of the rock dust tends to settle on the floor, an attempt should be made to coat the ribs and roof heavily, where it is undisturbed by the movement of haulage.

## ROCK DUST IN STEMMING HELPS

Rock dust used in the stemming of shots adds safety to the blasting of coal. The rock dust is so fine that little of it is loaded out with the coal. It mingles with the coal dust. About 10 lb. of rock-dust stemming is used in each 6-ft. cut.

George Rice asked if the coating formed by rock dust on ribs and roof would retard the rate of weathering or spawling. Mr. Fear believes that it will have this effect. In his Indianola mine he expects to have less trouble with the roof which is bad, by the substitution of rock dust for water, and he is certain the cost of the former is considerably less than the latter.

Chairman Jones checked Mr. Fear's estimate that 4c. per ton of coal mined will cover the cost of applying rock dust. He said that is the actual cost for applying rock dust along 122,270 lin.ft. of entry in one of the Old Ben mines.

# National Coal Association Elects S. P. Hutchinson President at Cincinnati Convention

In Quiet but Heavily Attended "Town Meeting" Sessions  
It O. K.'s Mellon Plan of Tax Reduction, Pats Coolidge  
on Back, and Hears Many "Outsiders" on Coal Problems

A "TOWN MEETING" style convention of National Coal Association in Cincinnati, Ohio, May 14-16, gave that body of bituminous coal operators a chance to speak its mind. Not much was said but the association did register, on the one hand, its approval of the Mellon plan for tax reduction and of President Coolidge's veto of the bonus and pension bills, and on the other hand, its disapproval of governmental interference in business, of the proposed plan for publicity of tax returns, the proposed surtax on undistributed corporation profits, and of the Coal Commission's suggested scheme for changing the basis of mine-car ratings.

The convention was not filled with big issues or fighting points. Main interest centered about the election of S. Pemberton Hutchinson, of Philadelphia, as president to succeed J. C. Brydon, who retired amid plaudits of the operators for the services he has rendered during the past year for the association and as chairman of the Bituminous Operators Special Committee.

The only contest for official position came on the floor of the convention when F. S. Love, of Pittsburgh, Pa., was nominated as a fifth candidate for the four directorships at large. The four nominated by a committee for the purpose and later elected were W. H. Cunningham, E. L. Douglass, Phil Penna and P. J. Quealy. In the voting the first three of these received almost the unanimous vote of the membership, while Mr. Quealy got 750 and Mr. Love 362. However, in a later session, Mr. Love was chosen a Pennsylvania director to succeed Mr. Brydon, who, as retiring president, automatically became a director ex-officio, thus leaving an unexpired term.

## Association Sound Financially

The association was able to show that it had done a good deal of work during the past year at a minimum of cost, and assurance was given that no special assessments over the regular one mill assessment are contemplated during the coming year. The financial report showed the association to be in sound condition and the membership report indicated that had it not been for the recent withdrawal of the entire Southwestern Interstate Coal Operators' Association with its 125 member votes, the total membership would have been enlarged over the previous year.

Registration was heavier than it ever had been at any previous convention, a fact that must be credited in part to the presence in Cincinnati of the American Mining Congress meeting and machinery show, which ran simultaneously. The programs of both were arranged so as not to conflict. They touched at

one or two points, such as the "get together" dinner on the night of May 13 and at a luncheon of the Congress May 15, at which H. N. Taylor and W. H. Wright spoke.

There were many good words during the convention for Harry L. Gandy, executive secretary for the association, who has finished his first year with the organization and was re-elected with a spontaneous show of approval.

## "LEAVE CAR RATINGS ALONE" SAYS NATIONAL

The National Coal Association, at its convention in Cincinnati last week, took a stand against any change in the present system of rating mines to receive cars, stating that the association "was opposed in principle to the use of a commercial factor in the rating of coal mines" as the U. S. Coal Commission suggested.

The resolutions committee had brought in a resolution favoring tax reduction without naming the Mellon plan. But T. W. Guthrie, of the committee, rose to insist that it be named. H. N. Taylor, also of the committee, and C. E. Bockus, chairman, explained that while probably all the members of the committee believed in the Mellon plan and could well campaign for it as individuals, yet it might be impolitic for the association, as such, to single out any one bill aiming at the desirable object of lower taxes. It might cause needless irritation in certain quarters in Washington.

The amendment was adopted by a vote of 16 to 12 and the resolution was passed.

In the opening session the morning of May 14 President Brydon, after a year of service, delivered a report without specific recommendations except suggestions that the association keep up the work it has been carrying on, to study labor conditions continuously, to compile facts about coal regularly, keep up the public educational campaign, and be prepared for any contingency that may arise. His recommendation last year that the presidency be put upon a full-time salary basis was not adopted by the directors last autumn because it was felt that expenditures should be kept at a minimum and because the executive secretary was able to assume many of the duties that might have devolved upon the president.

Mr. Brydon reviewed the work of the Bituminous Operators' Special Committee which served during the time of the U. S. Coal Commission's life. It submitted to the commission no less than sixty briefs setting forth the coal

industry's case. He spoke also of the plan worked out by the association last summer for emergency distribution of bituminous coal—a plan which can be put into effect whenever the necessity arises. He reported that the publicity efforts of the association had resulted in the sending out of 429,000 copies of briefs submitted to the Coal Commission and of Commission reports.

Incidentally he announced that the association is about ready to issue an annotated edition of all the reports of the commission—two 1,000-page volumes.

Harry L. Gandy, executive secretary, in his report spoke of the retrenchment program of the association and of its determination to give the members a maximum of service at a minimum of cost. The association maintains no continuing counsel, he said, yet the employment of counsel in such matters as the defense against Federal Trade Commission demands saved the operators of the country more than the defence cost.

Although various further reductions in expenditures will be made, he said it is necessary to keep up most of the statistical work of the association in order to meet the frequently arising need for exact and satisfying data on coal that is requested from so many sources and which has been used so effectively during the past year in the country-wide campaign of education.

He recommended that the association conduct systematic researches to place before the industry and the public approve modern methods of combustion and proper combustion appliances. Mentioning the publicity work he said *Coal Review*, the association's magazine, has lost money but that it has served a purpose and has saved the cost of issuing bulletins that otherwise would have been necessary.

The association is still operated on its ordinary 1-mill assessment and he gave assurance that no special assessments are in prospect. Increased revenue, if any, he said would come from increased membership.

The foreign trade committee reported with pleasure that Section 28 of the Merchant Marine Act will not take effect next month, as originally ordered. On May 8 the U. S. Shipping Board withdrew its certification from the Interstate Commerce Commission and that commission will cancel its order to the railroads. This leaves Section 28 under suspension indefinitely. This section provided that in order to get the benefit of the export rail rate to tidewater, goods exported had to move from the port in an American ship.

W. H. Cunningham reported for his committee on government relations,



mentioning its watchfulness over the legislative matters at Washington, which included scanning 227 bills of interest to coal and active participation in hearings on two. The May 7 hearings before the Mines and Mining Committee in the House on the general question of mine safety moved the committee to say this: "Opinions from the field indicate that while keenly appreciative of the necessity for carrying on mine safety work and education, yet local conditions should and do govern safety orders, and that it is hardly probable general orders could be issued from Washington or any other central point that would properly apply to the entire country, even if it be established that such a centralization of authority would be legal."

Publicity work for the year was of two classes, according to the report of C. E. Bockus, chairman of the committee on publicity. It covered publicity for the Bituminous Operators' Special Committee and regular association publicity. The first cost \$80,000, including \$22,000 for the speakers' bureau.

A brisk and interesting address on the service of trade associations was delivered by R. S. Kellogg, of New York, secretary of the News Print Service Bureau. He said such associations are needed keenly in an industry like that of coal, where there are so many small units and such diversity of interests among operators. A trade association is of service both by setting standards of commodities and practices and by gathering and setting forth facts to guide legislation and public thought in the best interests of the industry and the country.

At a final meeting and luncheon of directors, Charles W. Connor, of the Northeast Kentucky Coal Operators' Association, was chosen from that district to succeed E. L. Douglass. There was no Wednesday afternoon session so as to avoid conflict with the American Mining Congress meetings afternoons all week, but that evening Secretary Gandy delivered an address to the public on coal, its comparative inex-

haustibility and service to the people.

A good deal of outside viewpoint on coal was brought to the convention in the Thursday morning session, when speeches were made by President Samuel B. Crowell of the National Retail Coal Merchants Association; John Lee Mahin, head of a New York advertising agency; Melville E. Stone, president of the Associated Press, and George H. Cushing.

After 38 years in the coal business, not only as a retailer in Philadelphia but also as an operator and wholesaler, Mr. Crowell, speaking on "Our Customers," said they are really the employers of both producers and retailers and that both should join in thought and energy to hold the good will of those consumers.

From the retailer's standpoint he urged that as an economy measure the number of sizes of bituminous coal marketed be reduced. He appealed to the operators to devise some system of labor relations so that the supply of coal to the public will not be shut off every time there is a disagreement between miner and mine owner.

He advanced once more his idea for a "coal institute" backed by all the factions of the industry to better educate the public in matters relating to coal and to improve the economics and the methods of the industry.

Marketing of coal ought to be regarded with more foresight by the coal industry, according to Mr. Mahin, who is president of the Federal Advertising Agency. The industry may be too prone to listen to the opinions of men who consume coal directly. Instead, it should look beyond to the people who make use of the energy which is in the coal. It is the user of the railroad—the one who actually profits by the energy in the coal which the railroad consumes—who makes the coal market. Therefore, the coal industry should look broadly to him and cultivate him in order to merchandise properly the fuel it produces.

The head of the Associated Press, one of the world's greatest agencies for

collecting and disseminating news, contended for better co-operative effort between employer and miner.

Both operators and miners ought to recognize that they hold a trusteeship for the public. They have no right to exercise monopolistic control of the coal this country needs, and neither of them should be monopolistic in their own division of the work of the industry. He believes in competition, in the labor of coal digging, and in the selling of coal just as he does in the gathering and handling of news.

The complete list of new officers and the list of directors chosen to fill this year's expiring terms follow:

President, S. Pemberton Hutchinson, president of the Westmoreland Coal Co., Philadelphia, Pa.; vice-presidents, Ira Clemens, president, Clemens Coal Co., Pittsburg, Kan.; Michael Gallagher, general manager, M. A. Hanna Co., Cleveland, O.; George B. Harrington, president, Chicago, Wilmington & Franklin Coal Co., Chicago, Ill.; Walter Barnum, treasurer, Pacific Coast Co., New York, N. Y.; treasurer, C. E. Bockus, New York, N. Y.; executive secretary, Harry L. Gandy, Washington, D. C.

Directors-at-large: E. L. Douglass, Cincinnati, vice president, First Creek Mining Co., Kentucky; Philip H. Penna, Terre Haute, Ind., secretary, Indiana Bituminous Operators Association; Walter H. Cunningham, Huntington, W. Va., secretary, West Virginia Coal Operators Association; P. J. Quealy, Kennermer, Wyo., president, Gunn-Quealy Coal Co.

The following district directors were chosen: George B. Harrington, Chicago; L. C. Madera, 3d, Philadelphia; George H. Tytus, Columbus; Walter Barnum, for Washington State; C. E. Bockus, New York City; Ira Clemens, Pittsburg, Kan.; M. L. Gould, Indianapolis; T. W. Guthrie, Pittsburgh, Pa.; W. H. Huff, Denver; W. F. McGeath, Omaha; T. F. Farrell, New York City; J. G. Puterbaugh, McAlester, Okla.; C. W. Taylor, Greenville, Ky., and S. L. Yerks, Birmingham, Ala.



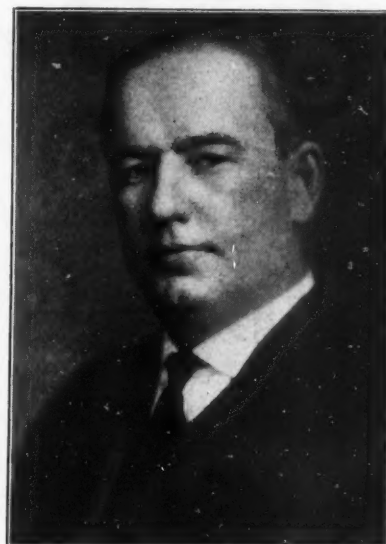
**Walter Barnum**

Director of National Coal Association, Resident of New York and Seattle, Connected with Pacific Coast Coal Co.



**S. Pemberton Hutchinson**

Newly Elected President, National Coal Association, and President, Westmoreland Coal Co., Philadelphia, Pa.



**Harry L. Gandy**

Re-elected Executive Secretary, National Coal Association, Former Representative in Congress of South Dakota

## New Equipment Shown at Cincinnati Convention

Many New Devices Making Mining Safer or Cheaper Exhibited—  
Pumps, Car Greasers, Track Equipment, Locomotives, Cars and Car  
Dumps Among Major Items—"Side Show" Attracts Much Attention

By FRANK H. KNEELAND  
Associate Editor, *Coal Age*  
New York City

**I**N ORDER to enter the Convention Hall at Cincinnati, it was necessary for the delegates to pass into the Machinery Exposition. Here the booths of the exhibitors were arranged upon either side of three long aisles, with breakthroughs between them at suitable intervals, so that it was unnecessary for the visitor to pass to the end of an aisle in order to gain admission to another.

Although a vast amount of equipment and machinery useful to the coal producer was on display, no attempt will be made in these pages to describe or even enumerate all of the exhibits. Volumes might be written on such a subject without exhausting the possibilities of the show. It will be rather the intention here to take up briefly those pieces of equipment and devices that are new to the coal industry and which, therefore, are of particular interest to coal mining men. We will, accordingly, pass along the booths in approximately the order in which they were numbered, noting the various items or new equipment and apparatus as found.

In space 3, which was shared by the Roberts & Schaefer Co. and the American Coal Cleaning Co., G. R. Delamater had on exhibit what is known as the Delatester. This is an apparatus invented by the

exhibitor who devised it as a ready means for quickly and

simply applying the float and sink test to coal. It is shown in Fig. 1. In this apparatus a complete separation of free pieces of coal from free pieces of slate or other impurities can be made by means of a solution that will float the coal but allow the impurities to sink.

The float and sink test is made by mixing a sufficient amount of granular commercial zinc chloride with water so that the resulting solution will have a specific gravity of, say, 1.60 and then depositing in this solution a sample of the coal to be tested and thoroughly stirring. Particles having a specific gravity of less than 1.60 will float, while those of a greater

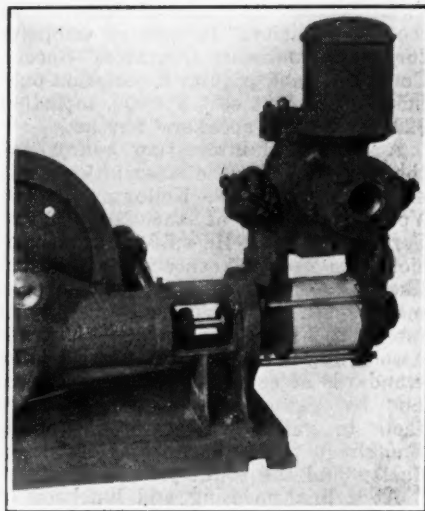


Fig. 2—Gathering Pump

The vitreous china cylinder of this pump is proof against the attack of acid. Other parts of this machine coming in contact with the water are of bronze or other acid resisting material.

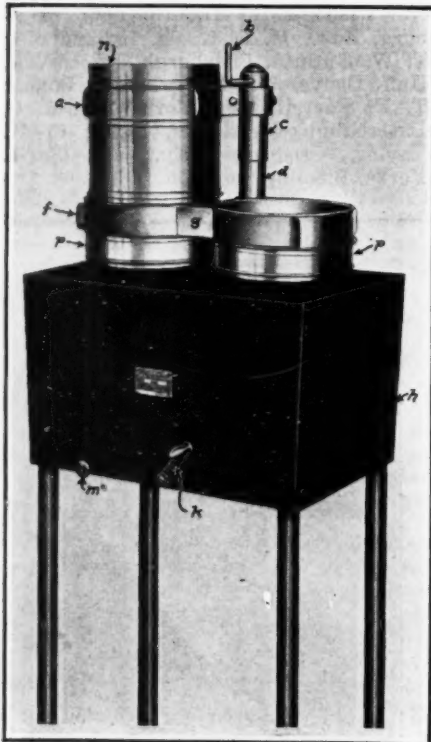


Fig. 1—Delatester Assembled

By use of this machine the float and sink test may be readily applied to a mixture of coal and slate to determine the possible advantages that may be derived from concentration, washing or other means for bettering quality.

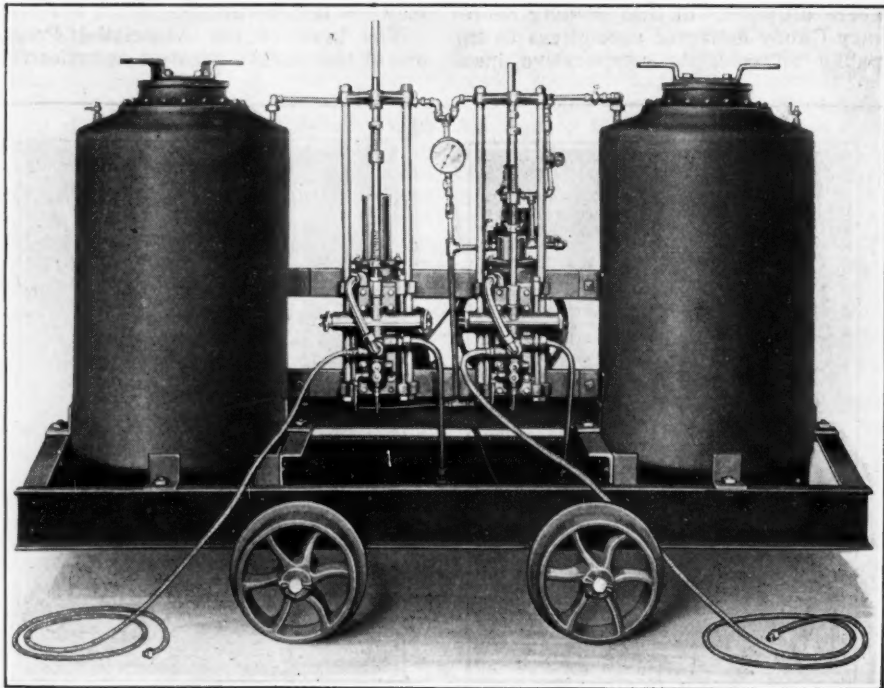


Fig. 3—Lincoln Car Greasing Machine

By means of this machine a measured charge of grease is forced into each car bearing. On test one man has greased the four wheels of a car in one minute.



specific gravity will sink. The percentage of material that floats may then be determined and this material analyzed for ash, sulphur, etc., in the ordinary way. The sink may be treated in a like manner.

Similarly tests may be made on coal samples using a liquid of any desired sepecific gravity down to, say, 1.30. Ordinarily, as the specific gravity of the liquid is decreased, the percentage of material that will float in it will also be decreased, as well as the ash content of that portion of the material which floats. The float and sink test may be employed for preliminary investigations to determine the extent of improvement possible through concentration methods, or for the control of coal cleaning plants in general. As may be seen, the Delatester is a simple apparatus that may be readily operated by

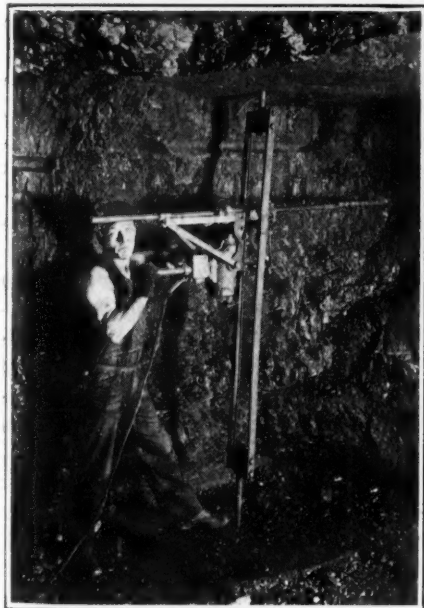


Fig. 4—Coal Drill at Work

The post mounting of this drill is little heavier than that necessary for a hand auger yet allows the drill to be operated at any height above the floor and at almost any angle, thus assuring correct placing of the shots.

ground to size inside with the ends faced off in a like manner. This is held in place by three long bolts extending between the front and rear cylinder heads. They not only hold the rear head in place, but clamp the entire cylinder to the pump frame. The two cylinder heads are joined to the valve chest by their upper flanges. The removal of five nuts (two from the bolts joining the rear cylinder head to the valve chest and the three from the tie bolts) permits the cylinder to be withdrawn. The piston is normally packed with square flax packing. The valves are of rubber working on bronze seats.

Although bronze was used in the metal parts of the pump on exhibition, for handling water of medium acidity cast iron parts might be employed. Specific advantages claimed for this pump by the manufacturers are: That the china cylinder being entirely immune to the action of acid, undergoes no deterioration in use

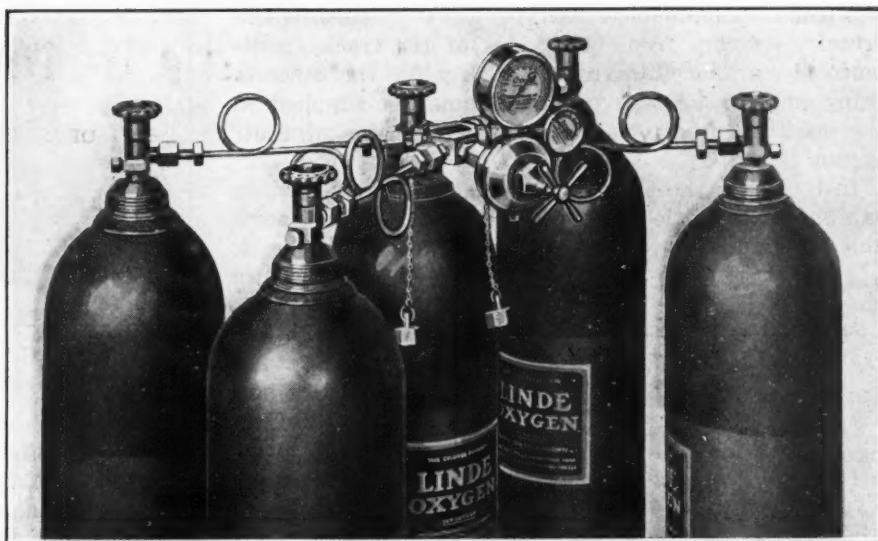


Fig. 5—Five Oxygen Cylinder Manifold

Although this manifold weighs only a few pounds and when taken apart may be packed in the regular tool kit, by making available the oxygen contained in five cylinders it permits the completion of a fair sized job without interruption.

almost any one after a little practice.

In space 10, the Deming Co. exhibited a mine gathering pump fitted with a vitreous china cylinder. This pump is intended for handling extremely acidulous water and is shown in Fig. 2. It is provided with a bronze valve chest, and in every other way made as nearly acid proof as possible. The cylinder or barrel is a plain straight cylinder or short tube of hard unglazed vitreous china,

except that arising from the friction of the piston. The china resists abrasion from grit in the water far better than would bronze, it being so hard that a fragment will readily scratch glass. No relining of the pump is necessary, and inasmuch as the cylinder may be turned in any desired position all of its inner surface may be worn away evenly.

The Lincoln Steel & Forge Co., occupying booths 15, 16 and 17, among other equipment showed its new car-greasing machine. This consists of two grease tanks of about 500 lb. capacity each, one of which may be used while the other is being filled or both may be used simultaneously. Two grease pumps are employed, both of which draw from either tank. A measured charge of grease is drawn into one of the pumps, the hose nozzle from this pump is inserted into the grease chamber of a car bearing and the grease cock opened. A measured charge of grease is thus forced, under pressure, into the bearings, after which a warning signal sounds and the grease cock is cut off. The machine is then ready for the next bearing without any appreciable wait.

The size of grease charge administered to each bearing is readily adjustable by moving a collar on the vertical piston rod. This adjustment takes but an instant to make and the charge may be varied between about  $\frac{1}{2}$  and 2 lb. On test, a car (four wheels) has been greased by one man in less than one minute. The entire machine is mounted on a regular-gage car truck and may be taken anywhere, where mine track is available for its transportation.

The total weight of this machine with the tanks empty is about 1,400 lb., or approximately 2,400 lb. with both tanks full of grease. A single-tank machine is



Fig. 6—Cast-Steel Mine Frog

This frog is made from a tough alloy steel intended to withstand over long periods the rough usage to which all mine track equipment is subject.

also made. The double-tank type, however, permits the greasing of cars from both sides of the track simultaneously, or the filling of one tank while the other is being emptied. An air compressor may be supplied on the machine, or air may be drawn from the mine air system if available.

In booth 38, the Chicago Pneumatic Tool Co. had on exhibition its Little Giant coal drill fitted with a portable post mounting. This machine is shown in Fig. 4.

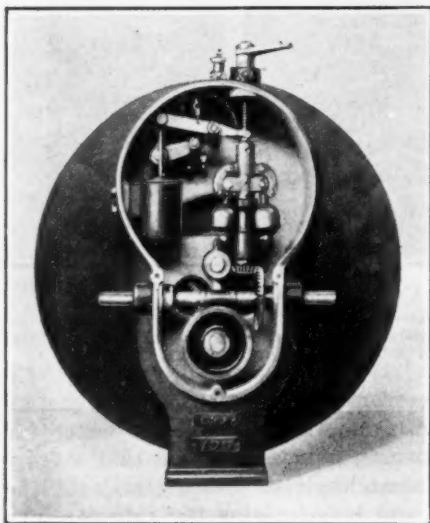


Fig. 7—Hoist Indicator

This is an overwind preventor and speed governor as well as a position indicator. Attachment to the hoist drum may be made upon either side.

change of augers in drilling the deepest shot-holes. It is unnecessary to remove the feed bar in order to change augers, as a split nut enables this bar to be slipped through it to its rearmost position. This saves much time both in setting up the drill and in changing augers.

The Oxweld Acetylene Co., occupying booth 40, among other useful devices had on exhibition its five-cylinder, portable oxygen manifold. This manifold is small and of light weight, designed especially for work in the field. By its use five oxygen cylinders can be connected together, thus supplying a sufficient amount of oxygen for a considerable job. This device weighs only 10 lb. and when taken apart may be carried in the tool kit.

In detail, this manifold consists of a hexagonal brass block with six connections, five for the cylinder and one for the regulator. Four of the five cylinder con-

The mounting here employed is especially designed for use with Little Giant drills. It is light in weight and can be readily set up by one man as quickly as a post for a hand auger. When in operation the weight of the drill itself is borne by the mounting, thus permitting the proper placing of top holes in high coal. The feed bar is 5 ft. long, which necessitates only one

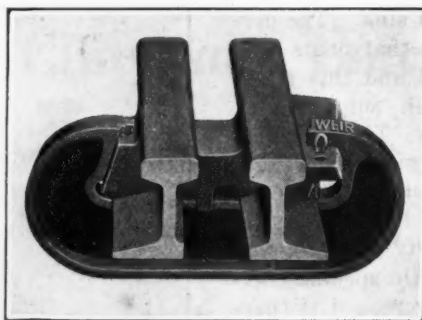


Fig. 9—Guard Rail Clamp

This clamp holds the guard rail securely in position without the use of either bolts or spikes.

directly opposite this rigid connection. When less than five cylinders are employed, the extra connections are closed by means of caps attached to the block by chains. A manifold of this kind is particularly useful in small shops that do not handle a sufficient volume of work to warrant a 10-, 20- or 30-cylinder manifold. This device is shown in Fig. 5.

In booth 57, the Cincinnati Frog & Switch Co., among other exhibits, showed its cast steel mine frog. This is illustrated in Fig. 6. The chief point of excellence of this frog is the alloyed steel of which it is made. This is an extremely tough metal intended to endure indefinitely the pounding and rough usage to which all track appliances in the mines are inevitably subjected.

In booth 65 the Duro Metal Products Co. had on exhibition several of its speed indicators for hoist engines, one of which is shown in Fig. 7. As may be seen, this is an extremely simple device, thoroughly protected from dust and dirt. The governor in this indicator is dampened by an oil dash pot, so that sudden changes of speed or jerks will not cause it to become operative and shut down the hoist prematurely. As may be seen in the figure, the drive shaft is available for connection to the hoist upon either side. The side chosen should be the one where best protection is secured and where it will be out of the way of workmen. As a rule, this controller must be positively driven in a proper ratio from the hoisting drum shaft. Steel roller chain and cut steel sprockets are employed for this purpose. The standard drive speed is 130 r.p.m. and the gears employed are arranged to afford a maximum amount of dial movement for the full travel of the cage.

Booth 71 was occupied by the Rail Welding & Bonding Co. The bonds used by this firm instead of being

nections are at the ends of flexible, double-coil copper tubes, while the fifth is short and rigid and connects the block directly to the valve of the cylinder, thus serving as a support for the entire manifold. The oxygen regulator is coupled

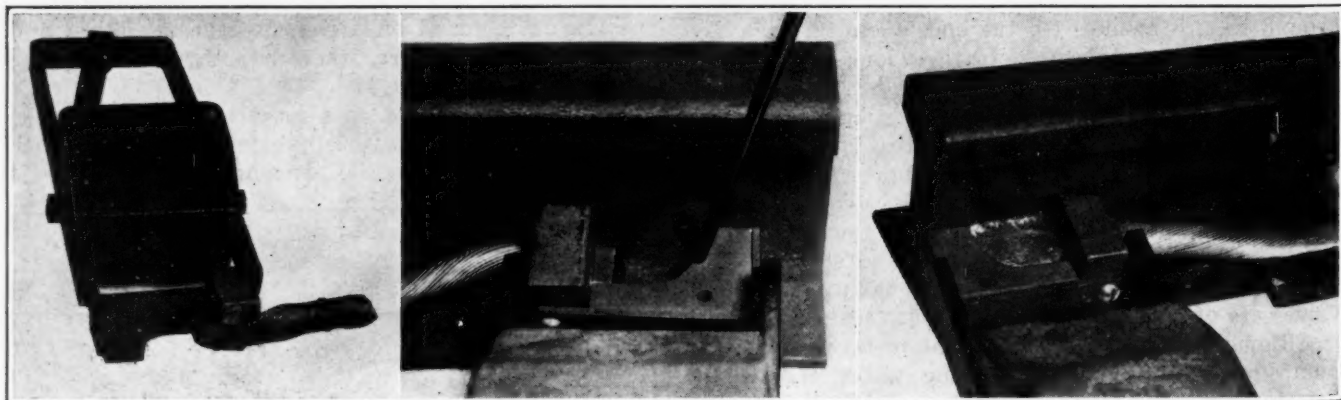


Fig. 8—Brazing a Bond to the Rail

First the terminal is gripped in a mold which is fastened in proper position. Next the electrode is fed down until the mold is full of molten metal. This is allowed to cool before the mold is removed. In this way the bond is effectively brazed to the rail and a good electrical contact made.



welded, steel to steel, on the rail are attached by what practically amounts to a brazing process. As may be seen in Fig. 8, the ends of the bonds are clamped in a suitable mold after which a metal electrode of the proper composition is applied until the mold is full of molten metal. This adheres to the bond terminal and likewise to the rail. The contact area between bond terminal and rail secured by this means is from four to six times the cross-sectional area of the bond cable. This furnishes a large factor of safety and is an excellent electrical connection because the copper bond head is welded or rather brazed direct to the steel rail.

In booths 74 and 75, the Weir Frog Co. showed its Titan guard-rail clamp intended for light rails. This clamp is shown in Fig. 9. It consists of a yoke of heavy forged steel shaped to fit the rails and a steel key tapered where it fits the yoke. When this key is driven up tight, there is no chance of the guard rail rolling or tilting out of position. No spikes, bolts or rail braces are necessary with this clamp. It is now manufactured in sizes to fit rails weighing from 25 to

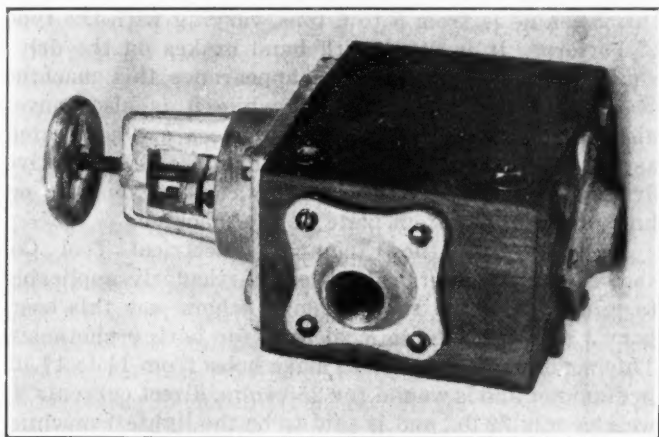


Fig. 10—Acid-Resisting Valve

All parts of this valve coming in contact with the water are made of wood or rubber. Extremely acidulous water accordingly may be handled by it without injury.

45 lb. per yd., and is especially adapted to tracks where motor haulage is employed.

A decidedly unique device designed to contend with extremely acidulous water in mine drainage was shown by Bennett & Meyer in booth 85. This consisted of a line of valves, all parts of which coming in contact with acid water were composed of wood. A valve of this kind is shown in Fig. 10.

These valves which may be made in the angle straightaway globe and check types, may be fitted for connection to screwed or flanged metal pipe or to the ordinary wood stave pipe employed under extremely acidulous conditions. The valves are so built that a wooden disk bears on a wooden seat. As a variation of this construction, a rubber seat may also be employed.

In booth 56 the General Automatic Scale Co. had on exhibition its Weightograph. This is practically

an automatic scale wherein the weight indicated is projected onto a ground glass in front of the observer. The figures showing the weight are engraved on a small quadrant within the machine behind which an electric light is placed in such a manner as to project the

figures before the eyes of the weighman. When a load is placed on the scale, it is balanced and indicated promptly and automatically by one moving member. As the scale is depressed by the weight of the load, the light flashes on and the chart revolves into position, showing the weight on the reading screen in large illuminated figures and graduations. This gives a clear plain reading that can be seen from any angle and almost any distance. This device at a mine renders it necessary only for the weighman to record the weight indicated. It is shown in Fig. 11.

In booths 91, 92 and 93, the Enterprise Wheel & Car Co., along with other equipment, showed a new car of interesting design and large size. This is shown in Fig. 12. This car is especially adapted to machine loading, as it stands only 36 in. above the rail. The car box is 10 ft. long inside, 6 ft. 8 in. wide and is 24 in. deep. The length over the bumpers is 12 ft. and the weight 4,300 lb. It is a solid body car intended for use in connection with rotary dumps.

At the end of the right-hand aisle in the Exhibition Hall, in a space which might have been designated as 96-A, the Davies Mine Switch Lock Co., Inc., showed a model of its solid and automatic mine switch locks.

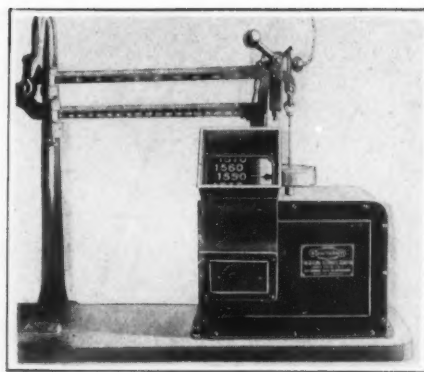


Fig. 11—The Weightograph

The weight on the scale platform is shown in illuminated figures. The weighman accordingly need only record the figures shown by the machine. No shifting of beam weights is necessary.

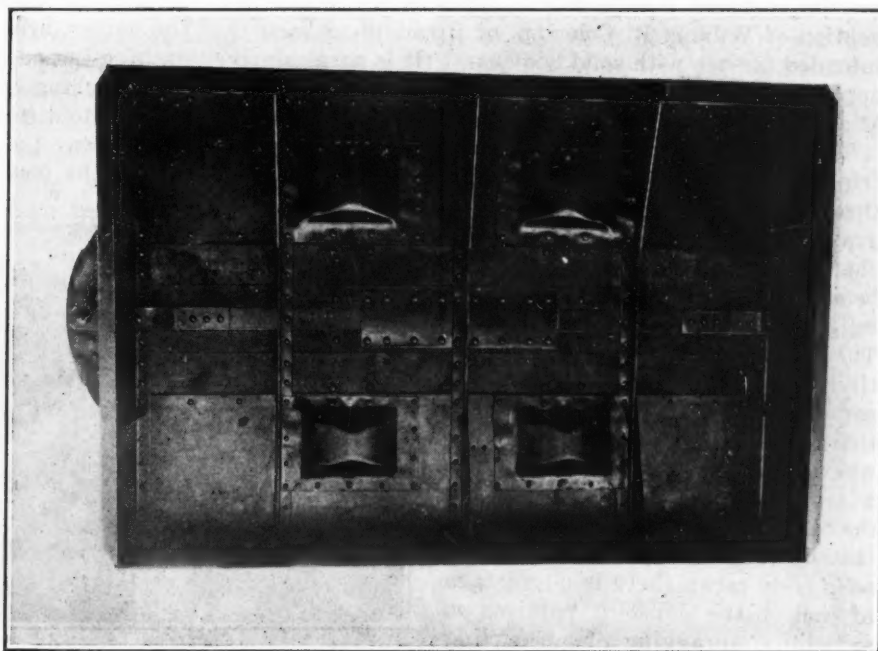


Fig. 12—Large Car Intended for Machine Loading

This view is looking almost directly down into the car box. Only by getting alongside this car can its unusual size be appreciated adequately.

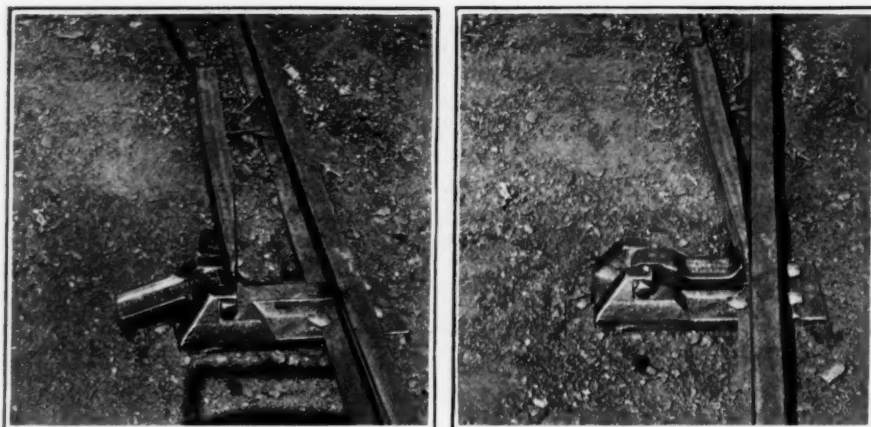


Fig. 13—A Switch Lock Installed

This lock not only forms a bed plate supporting the switch point but when the point is thrown and the tongue folded down the switch is locked in position.

One of these is shown in Fig. 13. This device is intended to lock the switch latches of rails weighing from 25 to 40 lb. per yd. It consists of a chair or plate upon which the rail rests, and to which is fastened a tongue, which when the switch is thrown may be folded over securely locking the switch point in position.

This device is simple in construction and may be readily and easily installed. It can be adjusted to fit any size of lock or switch point and its use will eliminate, so it is claimed by the maker, the numerous difficulties encountered in present-day operation such as spreading of the track gage, tilting of the rails, lowering of the latch point below the rail level, or the springing open of the latch. It will also obviate the use of wood either to support the latch or to hold it in position, likewise the holding of the latch in position by hand when a trip is approaching, or the accidental disengagement of the latch through the stubbing of the toe by either a man or mule, and the slewing or pushing of cars to make them take a switch.

Alongside of this space, or in what might have been called booth 96-B, the General Mine Equipment Co., of Birmingham, Ala., showed moving pictures of a new gravity-operated rotary dump. This device is the invention of William R. Coleman, of Birmingham, and is intended for use with solid body cars. It is particularly applicable at slope mines, although it may be installed at any operation suited to any rotary dump.

This dump is so designed and constructed that a trip of cars coming out of the slope may be hauled through it and then lowered back by gravity, the dump automatically discharging one car at a time. As may be seen in Fig. 14, only one man, the weighman, is located in its vicinity. The operation of the device is entirely automatic, except that when a car of slate or of rock is to be discharged the weighman throws a lever whereby this material is dumped into a separate bin from that receiving the coal. The advantages claimed for this device are as follows: It uses solid body cars; there is no wastage of coal on the slope; it requires no switching, spragging or uncoupling of cars and dumps continuously; the cars feed and spot themselves automatically, while the oil-cylinder con-

trol of this machine prevents shock or vibration; it entails minimum degradation of coal and no power other than the force of gravity is required for its operation; the machine is entirely automatic and will discharge a minimum of five cars per minute; only one man, the weighman, is required. The construction necessary for its installation is decidedly simple; it may be built to accommodate any size or type of car.

In booths 104 and 105, the Ironton Engine Co. had on exhibit its storage battery locomotive, type WLS, especially designed for low coal. This machine stands only 25 in. above the rail, yet has a storage capacity of from 30 to 40 kw.-hr., depending on

the type of battery used. The effective length when rounding curves is 10 ft. 6 in., while the width is made equal to that of the cars employed. The total weight of this machine is from 5 to 6 tons, varying with the type of battery. It is fitted with band brakes on the drive shaft and a worm drive. In appearance this machine seems to be extremely rugged while it is also convenient in operation. All control devices are so located as to be readily within the reach of the locomotive driver, even when because of low coal he must lie on his side on the bottom plate of the machine.

In booth 100, the Cincinnati Electrical Tool Co. showed various electrical devices particularly applicable to mines and mine shops, among others was this company's one-man electric coal drill for boring shotholes. This machine is intended to make holes from 1½ to 1¾ in. in diameter and is wound for 250 volts, direct current. It weighs only 22 lb., and is said to be the lightest machine of this capacity at present on the market. This machine has been tried out in both anthracite and bituminous coal and after six months of operation is said to work satisfactorily in every way.

Booth 112 was shared by the Flexible Steel Lacing Co. and the McKinlay Mining & Loading Machine Co. The latter firm exhibited a model of a new mining machine intended to drive an oval or elliptical heading. This machine consisted of two cutter-heads revolving in opposite directions and a cutter chain which removed or cut away the triangular segment left by them. Although the idea of the revolving cutter-head is by no

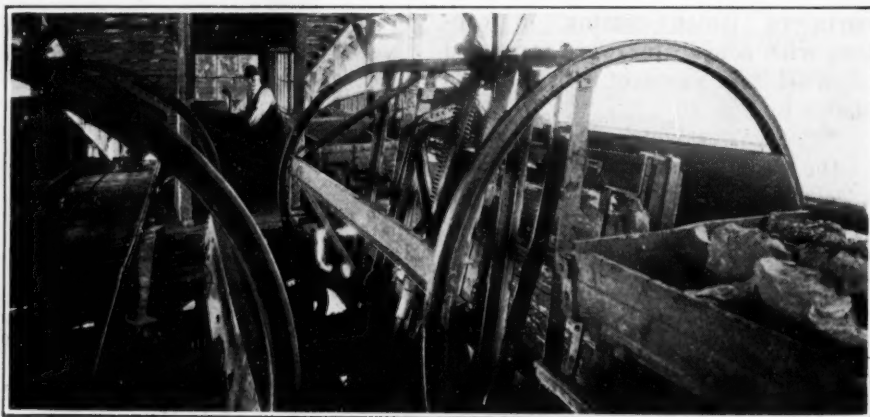


Fig. 14—Gravity Operated Rotary Dump

This dump needs no power for operation other than the force of gravity. It automatically feeds, spots, dumps and releases the cars. A trip need not be uncoupled during the dumping process thus saving much delay.



means new, several unique features have been added to this machine. Thus lump coal is produced by what might be termed revolving weights, working in the slots made by the cutters on the revolving heads. The coal cut down is delivered to a belt conveyor of adjustable length and is eventually loaded into cars on the heading. The machine is forced forward to its work by means of hydraulic jacks. While apparently heavy and cumbersome, it is in reality extremely simple and cuts an almost ideal heading in the coal.

In booth 81, among other exhibits, the Watt Mining Car Wheel Co.

showed model cars equipped with a device known as the Bulldog automatic coupler. This device is shown in Fig. 16. The construction of this coupler, as may be judged from the accompanying photographs, is decidedly simple and few parts are employed. The coupler will operate upon straight track or upon any curve found in the mines. Lost motion between cars is practically eliminated and the labor entailed in coupling and uncoupling is saved. It is estimated that about 6 per cent of mine accidents occur in the operation of coupling cars and the makers of this device claim that its installation will eliminate this danger entirely.

One of the reasons for making the present hitchings of mine cars long, allowing considerable play between adjacent car bumpers is the fact that an uneven track causes a decided relative vertical movement between the car ends. This automatic coupling is so arranged as to provide for this movement without possibility of the cars becoming detached from each other.

Booth 45 was shared jointly by the Timken Roller Bearing Co. and the Dodge Manufacturing Corp. This latter firm had on exhibition its Timken-equipped shaft hanger intended for use on line shafts of all kinds. This device is applicable to any type of hanger using a four- or two-point suspension. The bearings proper are manufactured by Timken and marketed by the Dodge company. The saving in power effected by this use over that entailed by ordinary plain bearings is 10 to 50 per cent, depending upon conditions.

The bearing proper consists of two Timken roller bearings mounted on a ground steel tube and fitted with an accurately machined cast-iron housing. Grease seals are provided and two clamping collars are mounted on the threaded ends of the steel tube. This tube is slotted at either end, and is held to the shaft by the two collars which are also used to obtain accurate

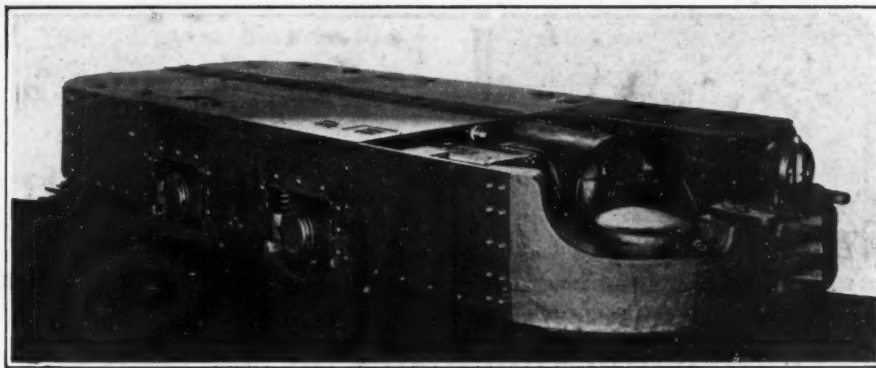


Fig. 15—Low Storage-Battery Locomotive

This machine is so low that it could pass under a table. It is fitted with band brakes and it is claimed that the motorman can slip the drivers by the pull of one finger on the brake lever.

adjustment of the bearings on the steel tube. This adjustment is made at the factory and need not be altered by the user. Housings of this kind are adapted for use in practically any type of hanger. The mounting of the tapered roller bearing as described insures full utilization of the bearing for both radial and thrust loads. It also provides a bearing of great ruggedness and is of particular value in resisting the side weave of heavy driving belts.

The method of fastening the bearing sleeve to the shaft permits its use on ordinary commercial shafting which may vary slightly in diameter. The sleeve is fastened to the shaft by setting up the set screws in each of the clamping collars. Space between the housing and sleeve is filled with grease which supplies lubrication over a long period.

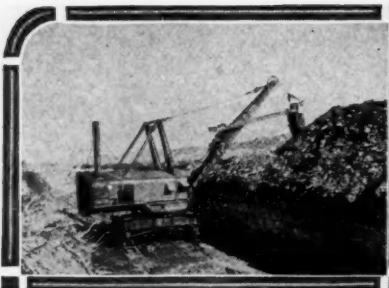
The foregoing are a few of the "high-spots" in the equipment exhibited. As stated in the beginning, volumes might be written on the show as a whole without exhausting its possibilities. It would hardly be just, however, to conclude any description of the exhibition at Cincinnati without mentioning what might be termed "the side-show." This was a tent in rear of the Exhibition Hall, in which two loading machines were shown at work. The operation of rail bonding was also exemplified. Almost everyone who visited the Exhibition Hall also paid a visit to this tent in the rear, where those inexperienced in the use of loaders gained a clear idea of how these machines were operated and acquired a reasonably accurate conception of their possibilities in actual use underground.

Taken all in all, the exhibition of machinery at this convention was a decided success. Upon all sides one heard the opinion voiced that the convention of 1924 was the most successful meeting of its kind ever held by coal men anywhere.

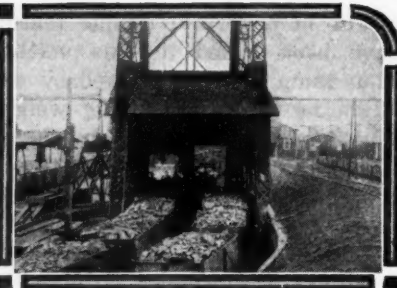


Fig. 16—Automatic Car Coupling and Its Parts

This coupling will operate upon any curve and its component parts are few and strong. Vertical movement between the car ends does not disengage the drawheads. Lifting one of the hooks uncouples the car.



## News Of the Industry



### Farrington Dominates on All Issues At Illinois Miners' Convention

Two-to-One Majority Sustains Peace with Lewis—Illinois President  
Threatened with Howat's Fate—Deposed Kansas Leader  
Says He Was Not Expelled from Union

(Special Dispatch to Coal Age)

Peoria, Ill., May 19—Frank Farrington, district president, tonight still held the whip hand over the biennial convention of the Illinois Miners' Union, supported by a two to one majority on all issues. His "peace" with International President Lewis was approved, as also was his "desertion" of Alexander Howat, deposed Kansas president, whom he charged in an address with joining W. Z. Foster and the communists at a Pittsburgh (Pa.) conference.

Farrington told the convention that Lewis had also threatened him with Howat's fate. Howat also spoke, saying he had been informed by Secretary Green two weeks ago that he had never been expelled. He said he had returned to work in the Kansas mines and wanted nothing but readmission to the union. He said he desired no back pay, nor anything but justice. He asked Illinois miners for "moral support." Decision was deferred. It is probable that the convention will adopt Farrington's proposal to investigate the feasibility of giant power plants.

#### Would Amend State Mining Law

Resolutions adopted by the convention included the following:

Demanding amendments to the Illinois state mining law, as follows: (1) Prohibiting mine examiners from carrying an open light into the mine, and compelling operators to provide an electric safety light for them.

(2) Requiring that there shall be an attendant at any and all doors in coal mines in the State of Illinois, to replace the present provision which is "that in any or all mines where doors are constructed in such a manner as to open and close automatically, attendants and places for shelter shall not be required." Such an amendment, the resolution says, if strictly complied with, would prevent "75 per cent of mine explosions," by preventing dangerous accumulations of gases, resulting from drafts caused by open doors. Automatic doors are unsafe, the convention was told, for the reason that chunks of coal get in the way, and sometimes the mechanism fails to act.

(3) Limiting the speed of mine locomotives or motors.

(4) Prohibiting coal companies from

turning a current of electricity into any coal mine until the mine has been examined for gas in all parts of the mine where wires are located.

(5) Requiring that all rooms in a mine, except those sealed up, both in old and new works, shall be examined by a mine examiner four hours preceding the day shift or night shift.

(6) Requiring coal companies to arrange separate compartments in wash houses, whereby miners could have their mining clothes in one compartment and their clean clothes in another, and so arranged that coal dust, grease and other dirt could not soil the clean clothes.

(7) Prohibiting miners from carrying into mines in their pockets detonating explosives, caps and detonators.

(8) Requiring two men on moving motors and mining machines.

(9) Requiring every mine to have its own shotfirers, thus abolishing the system in some places which requires each individual miner to shoot his own shots.

Considerable debate was occasioned by a resolution which demanded that "it shall become a part of our agreement, after April 1, 1924, that all operators must be bonded for all payrolls, and also compensation bills where they are not protected by some reliable insurance company."

President Farrington addressed the convention regarding this proposal. He said the only thing that could be done with it was to refer it to the scale committee which meets the operators three years from now. He said the only recourse miners have against operators who fail to pay their employees wages before closing down is to forbid them reopening until all back wages are paid.

#### Dan Harrington Leaves Bureau of Mines

Dan Harrington, Bureau of Mines engineer for years in the Rocky Mountain region, joins the Utah Fuel Co. and the United States Fuel Co., both of Salt Lake City, July 1 as consulting engineer in safety. His place in the West for the Bureau will be taken by Albert A. Munch, of the Pittsburgh, (Pa.) experiment station.

#### Hardwood Men to Compile Trade Data Soon Again?

The compiling of statistical information may soon be resumed by the American Hardwood Institute, one of the leading participants in the fight for trade statistics. At Louisville, Ky., May 9, the Institute gave its board of directors permission to re-establish the statistical program whenever the board feels that it can do so safely. The Hardwood people stopped compiling statistics some years ago as a result of interference from Washington, re-established the department, and again stopped it in January of this year, when the then Attorney General Daugherty wrote an unfavorable letter to Secretary Hoover.

#### Miner Plotters Confess

It was reported from Madisonville, Ky., on May 10, that Sam Coffman, of Madisonville, and Tom Richardson, formerly of William County, Ill., had been arrested and were in jail at Madisonville, charged with "confederating and banding together" in connection with an alleged plot to dynamite a plant of the Hart Coal Corporation, last February. Richardson confessed the plot and implicated Coffman, and also a member of the United Mine Workers office at Madisonville, who couldn't be apprehended at the time of the other arrests. A written confession was made by Richardson to County Attorney Franklin. The Hart Corporation has had some trouble in camp for months past as a result of going non-union.

#### Shipping Board Bids Fall Within Narrow Range

Bids received by the U. S. Shipping Board at New York on May 16 for furnishing and delivering alongside vessels operated by the Board in New York harbor of 1,430 gross tons of bituminous coal containing a minimum of 14,500 B.t.u. resulted in prices ranging from \$5.17 to \$5.48 per gross ton, or from about \$1.92 to \$2.09 per net ton f.o.b. mine. There were four bidders: Imperial Coal Corporation, \$5.17; H. B. W. Haff, \$5.39; W. A. Marshall & Co., \$5.20, and Seiler Coal Co., \$5.48. These prices compare with about \$1.92 to \$2.77 net ton f.o.b. mine in the bids opened by the Shipping Board on May 12, when 18 bids were received for furnishing and delivering alongside upward of 216,000 gross tons.



### British House of Commons Rejects Labor Measure to Nationalize Coal Mines

The mines nationalization bill was rejected by the British House of Commons May 16 by a vote of 264 to 168. The bill was introduced by George Henry Hall, Labor member, a Welsh colliery checkweighman, who said that nationalization had been demanded by the miners for a generation.

While agreeing with the principles of the bill, the Labor government took a cautious position, it being stated on behalf of the Cabinet that the Ministry disapproved of certain clauses, and consequently the bill was allowed to stand on its own feet as a private member's proposal.

Mr. Lloyd George declared the bill was the first concrete example of the new socialism which was to be put into effect as soon as the Labor Party got a majority. He declared that in addition to giving the miners the right to strike, the bill gave the same right to officials of the Mining Council, which meant that they could participate in a strike against a decision of the council, of which they were members.

#### Calls It Gigantic Trust

He stressed the fact that so much attention was paid in the bill providing for losses, the money for which was to come out of the public funds, while if profits were made they were to go back into the industry. This was not nationalization, he insisted, but a gigantic coal trust in the interests of one section of the community.

Mr. Lloyd George agreed that mining conditions were unsatisfactory, but he reminded the House that the Labor Party had rejected the government's ameliorative proposals of 1919. At the same time he was sure the House would not examine in a niggardly or partisan spirit any broadminded proposals to improve the miners' lot.

Emanuel Shinwell, Parliamentary Secretary of the Department of Mines, explained that while the government recognized that no mandate had been obtained from the electors to pursue a policy of nationalization, they heartily accepted the vital principle embodied in the measure. There was, he said, no solution of the problem confronting the mining industry, whether regarding production, distribution or utilization of the commodity, other than was to be found in national ownership. Sooner or later the principle would be accepted by the nation as a whole.

Sir Douglas Hogg said the present bill would be unjust to the miners, dishonest to the state and wholly inequitable to the interests of the consumer, and was deliberately devised to carry class warfare, not of one class against another but of one class against the community.

Mr. Smillie said it was the duty of the government to carry the bill into law. It was not only the miners but the whole trade union movement which was pledged to it.

### Some Miners Manage to Keep Wolf from Door

Net income tax returns of \$9,100 each for the year 1923 have been filed by two employees of the Soper-Mitchell Coal Co., of Morgantown, W. Va. Both men are coal cutters. Another miner employed at the same plant filed a return for \$6,500 with an apology for its size, stating he did not have steady employment. Another man reported \$2,700, claiming \$7,300 exemption for his wife and 12 children.

### More Pennsylvania Companies Revert to 1917 Scale

Following the lead of the Keystone Coal & Coke Co., the Hillman Coal & Coke Co. has made a wage reduction of 20 per cent at its Edna mines, Westmoreland County, Pennsylvania. The men at Edna No. 2 mine accepted and are working 100 per cent, but those at Edna No. 1 mine refused to accept the cut and are idle. This is in the Irwin gas coal basin.

In the same field, the Whyel Coal & Coke Co., whose two plants have been idle for several months, attempted to resume operations May 1 at a 10 per cent wage reduction, but the men objected and these mines are still idle.

In Somerset County all the companies (including the Consolidation Coal Co. and the Hillman Coal & Coke Co.) except the Berwind-White Coal Mining Co. reduced wages to about the 1917 scale and are working part time without any trouble. Union mines in the Pittsburgh and adjoining districts are getting slim picking, where they are working at all.

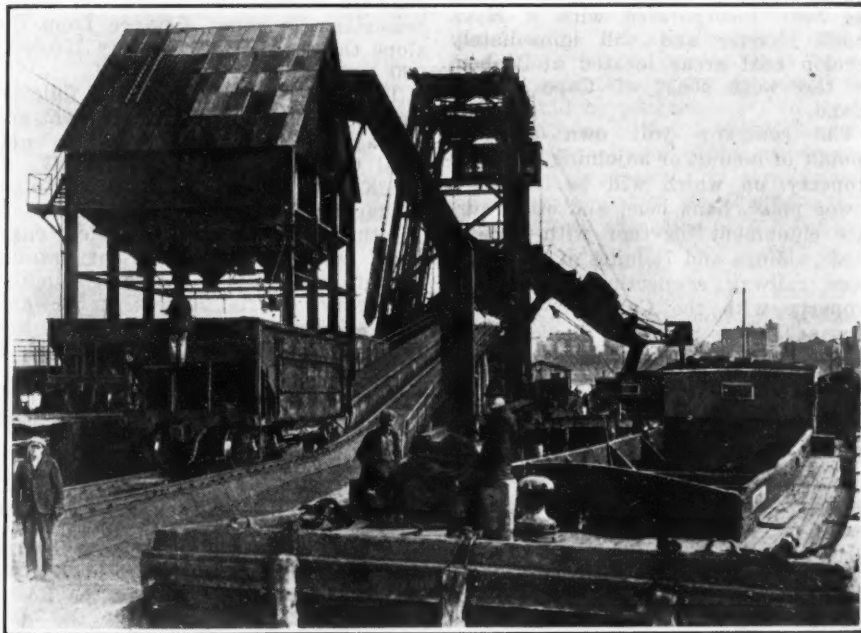
### Connellsville Coke Operation Cuts Wages 20 per Cent

The Lincoln Coal & Coke Co., Scottsdale, Pa., a merchant coke operator in Lower Connellsville with 300 ovens, on May 1, reduced wages 20 per cent from the Frick scale, outside day labor being cut from \$5.40 to \$4.32 and common day labor from \$3.60 to \$2.88. The company then had 200 ovens in operation. No business was forthcoming, however, and the 200 ovens have since been blown out. The men accepted the cut without question and work continued long enough to show that the reduced wages were actually in force.

Other coke operators are considering wage reductions, as this was the first reduction at a regular Connellsville coke plant. The prediction now is that before long many independent operators will reduce, and that then the Frick company may follow.

### One More Illinois Merger

The expected consolidation of Big Creek Coals, Inc., and the Harrisburg Colliery Co., both in southern Illinois, has taken effect. The new name of the company holding and operating the several Big Creek mines and the one 4,000-ton Harco mine is the Saline County Coal Corporation, headed by Charles I. Pierce, of Chicago, former president of Big Creek Coals, Inc., which only two months ago bought the Harco mine. The corporation controls 28,500 acres of land in Saline and Fulton counties, 8,565 acres of which is owned in fee and the balance held on long-term leases, principally from a subsidiary of the Big Four railroad. The total capacity of the group of mines is rated at 15,000 tons per day. The corporation is issuing \$2,500,000 of 6½-per cent 20-year bonds.



Courtesy U. S. Distributing Corp.

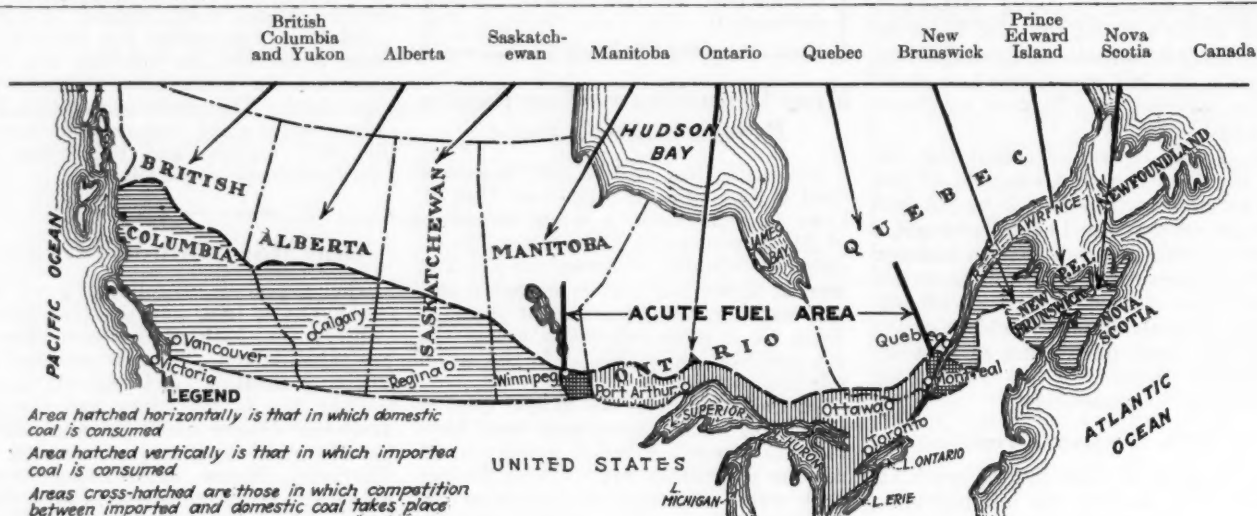
### Loading Coal Into Barges on the Hudson River

At Edgewater, N. J., one of the upper ports of New York Harbor. Most of the principal Eastern railroads have coal terminals on the New Jersey side of the river, where coal destined for New York is dumped into barges for shipment across the river. In the distance some of the buildings on the west side of midtown Manhattan are discernible.

## Coal Output, Exports, Imports and Consumption By Canada in 1923

(Preliminary figures, in Net Tons)

	British Columbia and Yukon	Alberta	Saskatch- ewan	Manitoba	Ontario	Quebec	New Brunswick	Prince Edward Island	Nova Scotia	Canada
Output.....	2,823,317	6,848,538	439,892	785,314	80,755	1,540,283	276,603	80,916	6,595,672	16,984,022
Received from.....	108,676	18,054	1,249,549	222,178	877	3	32,112	115,364	2,175,220	4,424,805
Shipped to.....	62,151	1,933,144	11,510	8,213	167,990	4,976,898	192,625	5,566	106,036	22,687,320
Exports (1).....	838,063	605	3,898	945,091	17,292,646	6,517,178	883,010	86,482	3,846,717	38,016,936
Imports (2).....	20,429	1,110	1,459,651	17.8	99.8	76.4	21.8	6.4	2.7	60
Consumption (4).....	2,052,208	4,933,953 (3)	1,459,651	17.8	99.8	76.4	21.8	6.4	2.7	60
Foreign imports in per cent of consumption.....	0.01	.....	0.03	17.8	99.8	76.4	21.8	6.4	2.7	60
Coal equivalent of developed water power (annual) (5).....	3,318,000	298,000	.....	1,458,000	13,009,000	10,058,000	401,000	20,200	492,000	29,554,000



(1) Statistics give exports by port of exit, not by province of production. For instance, the bulk of that exported from Alberta is shipped via Fernie and Cranbrook, B. C.  
(2) Total imports were 22,687,000 tons, of which 530,000 or 2.3 per cent, were from Great Britain.

(3) Over 2,000,000 tons supplied to railroads for traffic east and west.  
(4) Production plus imports and minus exports.  
(5) On basis of 9 tons per installed turbine horsepower per annum.

### Big Coal Development at Cape Breton Island

The Atlantic Coast Collieries, Ltd., has been incorporated with a Nova Scotia charter and will immediately develop coal areas located at Mabou, on the west coast of Cape Breton Island.

The company will own a large amount of land at or adjoining the mine property, on which will be located a power plant, bank head and other surface equipment together with railway yards, sidings and 7½ miles of standard-gauge railway connecting the mining property with the Canadian National Rys. at Mabou Station. The company also will hold under lease from the provincial government an area of 17 square miles, partly on land and partly submarine, all in the neighborhood of Mabou. This property contains four workable seams of coal of proven thickness and quality, viz: 7 ft., 8 ft., 15 ft. and 5 ft., in the order named. There also are three other known seams, viz: 11 ft., 4 ft. and 3 ft., which have not been proven and are not taken into consideration.

The report of A. J. Tonge, chief engineer and superintendent of mining operation, states that the amount of coal in the property is estimated at 400,000,000 tons, but partly owing to the uncertainty as to the depth of the seams may

attain seaward and partly owing to the possible inaccessibility of a portion of the area, particularly on the south side, it is estimated that within two miles seaward of the slope mouth and within reasonable working distance from the slope there are approximately 150,000,000 tons of coal.

The board of directors are as follows: President, Charles Fergie, president and managing director of the Intercolonial Coal Co. and vice-president of W. A. MacKenzie & Co.; A. H. Whitman, managing director of Robin, Jones & Whitman, Ltd.; A. J. Tonge, chief engineer and superintendent of mining operations; J. McG. Stewart, solicitor, of Henry, Harris, Rogers & Stewart; James Stewart, colliery owner, and George Ross, president of Ross & MacDonald, Inc.

An offering of \$4,000,000 7-per cent 20-year bonds of the company is to be made soon.

### Rock Dust Expert Tours West

J. E. Jones, safety engineer for the Old Ben Coal Corporation in Illinois, is now on a special tour of the Rocky Mountain region preaching the doctrine of mine safety by rock dusting under direction of the Bureau of Mines. Mr. Jones, after years of study and experimentation in rock dusting in the Old Ben mines of southern Illinois, is recognized as one of the country's experts in the subject.

### New Freight Rates Benefit Southwestern Field

The one element in the coal situation which is heartening to the coal producers of the Southwest Interstate region, comprising Kansas, Oklahoma, Arkansas and Missouri, who recently signed up for three years at practically the old contract with the union, is the new set of lowered freight rates from mines to principal markets. The rates help the operators to meet stiff Illinois and far western competition in the Missouri Valley territory, and take effect June 5 by railroad initiative although they were ordered for July 10 by the Interstate Commerce Commission. The following table tells the story:

To Kansas City From	Present Rate		Rate Ordered	
	Lump	Slack	Lump	Slack
Rich Hill.....	\$1.46	\$1.22	\$1.45	\$1.05
Pittsburgh.....	1.70	1.34	1.65	1.25
Arkansas-Oklahoma	3.28	2.31	2.65	2.25
Spadra.....	3.40	2.31	2.90	2.25
To St. Joseph From				
Rich Hill.....	1.70	1.70	1.75	1.35
Pittsburgh.....	1.82	1.70	1.95	1.55
Arkansas-Oklahoma	3.52	3.04	2.95	2.55
Spadra.....	3.77	3.04	3.20	2.55
To Omaha From				
Rich Hill.....	2.31	1.94	2.45	2.05
Pittsburgh.....	2.67	2.31	2.65	2.25
Arkansas-Oklahoma	3.89	3.52	3.65	3.25
Spadra.....	4.25	3.89	3.90	3.25
To Sioux City From				
Rich Hill.....	3.77	3.04	2.95	2.55
Pittsburgh.....	3.77	3.04	3.15	2.75
Arkansas-Oklahoma	5.22	4.50	4.15	3.75
Spadra.....	5.47	5.47	4.40	3.



## New National Coal Association President Well Known to Official Washington

Was Active in Capital as Member of Wilson Industrial Conference and Industrial Rights League—Record Notable for Fair Dealing with Consumer—Is Authority on Labor Relations

BY PAUL WOOTON  
Washington Correspondent of *Coal Age*

Selection of S. Pemberton Hutchinson as the new president of the National Coal Association has aroused much interest in various official quarters in Washington. Those officials whose duties bring them in contact with the coal industry are acquainted with Mr. Hutchinson, who has been a frequent visitor to the capital. He spent much of his time in Washington during the war, when he was connected with the Railroad Administration. Later he attracted official attention because of the part he played as a member of President Wilson's industrial conference. His duties as chairman of the League for Industrial Rights, which formerly had its headquarters in the capital, also brought him in contact with administrative officials and members of Congress.

Official Washington is interested particularly because it attaches deep significance to the National Coal Association. Most officials regard it as an essential organization. Without a national association, the coal industry could not speak its mind. In turn the government would be unable to deal with the industry if it were not for some such body.

### Association Judged by Leader

In the public mind an organization is judged to a considerable extent by its president. This is particularly true when the body is composed of such scattered and diverse interests as those composing the National Coal Association.

Washington was quick to recognize in the selection of the new president a promise to accentuate more than ever the need of faithful dealing with the consumer. The Westmoreland Coal Co., of which Mr. Hutchinson is president, has a long and honorable record of service to its customers. It produces a coal of exceptional quality in the Irwin gas district and is the mainstay of many gas utilities in New England and in the Middle Atlantic States. The company frequently is cited by coal specialists in Washington as an example in pointing out the benefits of good performance on contracts. The type of business that Mr. Hutchinson represents in dealing with consumers always is ready to sacrifice any immediate advantage in the spot market and maintain its contract deliveries.

Valuing trade associations as it does, Washington may wish that Mr. Hutchinson were more versed in the details of association work. He comes from a district in which there is no local operators' association of the ordinary type. He long has been a director in the National Association, however, and has learned much of the detail of the National's business recently through his

duties as its treasurer. He has not, however, had that day-to-day contact with the statistical and traffic services of a vigorous local association such as those of Indiana and southern West Virginia. There is no reason to think, however, that he will look unsympathetically on the service functions of the National. One of the hopes most frequently expressed in connection with the change of administration has been that it would be marked by building up the National's bureau of coal economics and the traffic service to the point where it ought to be built.

On one phase of the association's interest Mr. Hutchinson brings definite experience. He is an authority on the problems of labor relations. It is true that the National is eschewed from direct dealing with labor matters, yet its course and its activities are so closely related to them that a president with such experience cannot but be in a better position to assume leadership.

### Foe of Growing Union Power

Until a year ago Mr. Hutchinson was chairman of the League for Industrial Rights. This organization long has been associated in the public mind with that group of American employers who are seeking by legal means to check the power of trade unions. Mr. Hutchinson and the League not only believe that employers have a right to operate their plants without dealing with their men collectively but that it is feasible and expedient to do so. They believe that through legislation and through litigation it is possible to maintain the complete freedom and independence of the employer. Their experience has gone far to justify this belief. Mr. Hutchinson's own company and own district long have been non-union. Though the district was partly shut down by the 1922 strike, it emerged from that struggle without having surrendered any of the independence it seeks to retain.

The League has won some notable legal victories, one of which was the Danbury Hatters case, and another was the Bucks Stove & Range Co. case. It has been termed the liberal wing of the employers' movement. It is a storehouse and a clearing house for all information relating to the legal and constitutional phases of the labor problem. Mr. Hutchinson is clearly representative of the attitude of no compromise with the labor unions and a determination to exercise to the full the constitutional rights of employers. The public will see in his election the probability of a development of a labor policy in the National Coal Association. It also is admitted that his election will strengthen the belief that the associa-

### Will Miners Take Up Polo And Mah Jong Next?

Frank Hodges, Civil Lord of the Admiralty in the British labor government and formerly secretary of the Miners' Federation of Great Britain, partnered by Evan Williams, president of the federation, defeated the Duke of York and his partner, Captain Basil Brooke, 2 and 1, in a foursome golf match at Ton Petre, South Wales, May 17. The match was the outcome of a challenge by Mr. Hodges at a dinner a year ago, which was immediately accepted by the Duke.

It was played on the miners' course of nine holes, which was laid out by the miners themselves on waste land. All of the contestants are members of the Council of the Industrial Welfare Society.

tion is getting away from its original determination not to deal with labor matters and is becoming more and more the spokesman of the non-union branch of the industry.

### Says Vancouver Coal Reserve Has Been Overestimated

Coal mining on Vancouver Island was discussed recently by Charles Graham, mine manager of the Canadian Collieries (D), Ltd., before the Board of Trade of Vancouver, when he declared incidentally that the coal supply of the Vancouver district had been overestimated. Earlier surveys had placed the resources tentatively in the neighborhood of 4,733,000,000 tons of coal, while that made by the late Major J. D. Mackenzie shortly before his death two years ago, reduced this total to approximately 800,000,000 tons. While this is only an estimate over a large area, it is impossible to recover that tonnage, he said, while actual mining operations often proved that only a small percentage of an estimated tonnage could be produced.

In one mine at South Wellington only 10 per cent of the estimated tonnage had been recovered. By strange coincidence three out of four diamond drills sunk over an extensive area had struck small deposits. Subsequent mining operations proved the great bulk of the property to be absolutely barren of coal. Faults are frequent in Vancouver Island mines, necessitating considerable expenditures of an unproductive character to pass these in search of additional measures.

Mr. Graham declared that mining operations were conducted as economically as possible in all the Vancouver Island mines. Owing to the frequent faults and geological formations it often is impossible to mine by machinery. The increased use of fuel oil in Vancouver industries has caused a heavy marketing loss to the mines of the Island. At Cumberland the mines average only about three days' work each week. Other mines also are either working short time or are producing less coal than formerly, employing fewer men. Little if any development work is being undertaken, he declared.

### Who's Who in the National

The following list of members and voting strength in the National Coal Association formed the roll call at the 1924 convention in Cincinnati, Ohio, May 14-16:

Association or Company	Votes
Alabama Fuel Association.....	22
Albuquerque & Cerrillos Coal Co.....	1
Anchor Coal Co.....	1
Atlantic Crushed Coke Co.....	1
Bair-Collins Co.....	1
Bear Creek Coal Co.....	1
Black Hawk Coal Co.....	1
Bridgeport Coal Co.....	1
Canon-Reliance Coal Co.....	1
Chicago, Wilmington & Franklin Coal Co.....	1
Coal Opers. Assn. of the Thick Vein Freeport Seam of Penna.....	12
Coal Opers. Assn. of Georges Creek.....	28
Cochran Coal Co.....	1
Colorado & Utah Coal Co.....	1
Consolidated Coal Co. of Saginaw.....	1
J. K. Dering Coal Co.....	1
Diamond Coal Co.....	1
Elk River Coal & Lumber Co.....	1
Gallup-American Coal Co.....	1
Good Clay & Coal Co.....	1
Greensburg Coal Co.....	1
Harlan County Coal Opers. Assn.....	43
Hazard Coal Opers. Exchange.....	74
Hillman Coal & Coke Co.....	1
Indiana Bituminous Coal Opers. Assn.....	62
Indiana Coal Producers Assn.....	9
Indiana Coal Traffic Bureau.....	43
Irwin Gas Coal Co.....	1
Jackson District Coal Assn.....	19
Jamison Coal & Coke Co.....	1
Kanawha Coal Opers. Assn.....	70
Keystone Coal & Coke Co.....	1
Latrobe Connellsville Coal & Coke Co.....	1
Lion Coal Co.....	1
Logan Coal Opers. Assn.....	51
Madeira-Hill Coal Mining Co.....	1
Loyal Hanna Coal & Coke Co.....	1
Mather Collieries.....	1
Miami Coal Co.....	1
Monongahela Coal Assn.....	17
Morris Run Coal Mining Co.....	1
New Alexandria Coke Co.....	1
New River Coal Opers. Assn.....	64
Northeast Kentucky Coal Assn.....	44
Northern W. Va. Coal Opers. Assn.....	83
Northwestern Pa. Coal Opers. Assn.....	30
Operators Assn. of Williamson Field.....	49
Pittsburgh Vein Opers. Assn.....	24
Owl Creek Coal Co.....	1
Pocahontas Operators Assn.....	36
Ramsey Coal Co., Inc.....	1
Rockhill Coal & Iron Co.....	1
Roundup Coal Mining Co.....	1
Royal Fuel Co.....	1

### Wuxtry! Howat at Work!

Alexander Howat, once president of the Kansas district of the United Mine Workers, but two years ago booted out for not taking orders from Indianapolis, is at work with a pick. He has tried every other way to get back in the union and failed, so now he is riding out from Pittsburg, Kan., in his automobile and going down in a mine of the Debut Coal Co. while his application for membership in Local 5517 at Skidmore, Kan., awaits action.

All he has to do now is answer certain charges still held against him before the International board of the union. Then perhaps he will be back in again and can continue his rebellious actions against the Lewis administration from within instead of from without. Hearl Maxwell and James McIlwrath, former district board members, who were expelled with him, also have gone back to work, and August Dorchy, his former vice-president, and John Fleming, one time board member, will soon follow.

### Railroads Speed Up Freight Movement in March

Freight cars were handled faster by class 1 railroads in March, 1924, than during any March on record, according to the Bureau of Railway Economics, the average daily movement per freight car for the month being 27.3 miles per day. This exceeded by 0.3 mile the average for March, 1923, and by 3.3 miles the average for March, 1920.

The average load per freight car in March was 26.6 tons, a decrease of 1.3 tons compared with March last year, and one and one-half tons under the average for the same month in 1920.

Freight traffic in March amounted to 36,420,962,000 net ton miles, a decrease of 2,800,772,000 net ton miles, or 7.1 per cent, compared with March, 1923. Compared with the same month in 1920, it was a decrease of 1,431,090,000 net ton miles, or 3.8 per cent. For the first three months this year, freight traffic amounted to 106,884,737,000 net ton miles, a decrease of 2.4 per cent from the corresponding period last year, when the greatest volume of traffic for any corresponding period on record was handled by the railroads.

### Washington Hopes to Beat Last Year's Record

Coal production of the State of Washington for the first quarter, January, February and March, 1924, according to Wm. R. Reese, chief state mine inspector, was 794,504 short tons.

By maintaining this ratio of production for the balance of the year the industry will show an increase of production of nearly a quarter million tons over that of the previous year (1923).

Present indications are that this will be realized. Fuel oil in the California fields is at the peak, if not on the decline, and prices inclining upward, which must reflect on the coal industry advantageously.

Lumbering also is showing a decided slowing down, which will decrease the supply of hog fuel and other lumbering wastes now competing with our coal.

Imports from foreign countries are also on the decline compared with the past few years. In fact, the present outlook carries with it much encouragement for the coal producers of this state.

### West Virginians Re-elect

The entire staff of officers for the West Virginia Coal Association, composed of the various associations of that state, was re-elected May 14 at Cincinnati in a meeting held during the National Coal Association convention. The officers are: President, J. G. Bradley of Dundon; vice-presidents, Everett Drennen, of Elkins, and G. H. Caperton, of Charleston; secretary, W. H. Cunningham, of Huntington; treasurer, C. C. Dickinson, of Charleston; assistant secretary, James E. Hart, of Huntington. The association urged the nomination of T. F. Farrell for director of the National from the smokeless field and Mr. Cunningham for director-at-large.

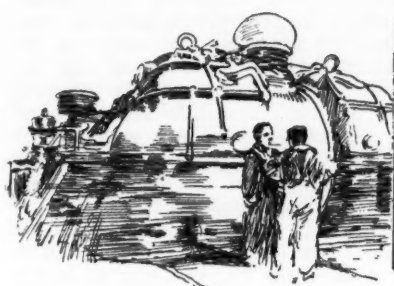


Courtesy U. S. Distributing Corp.

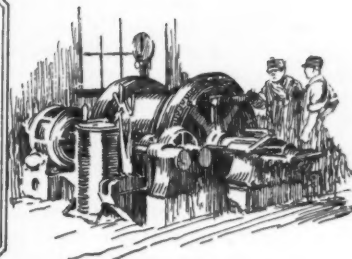
### Coal Awaiting Transportation by Barge

These trains are lined up in one of the big railroad yards on the New Jersey side of the Hudson River opposite New York preparatory to dumping in barges for shipment to the metropolis.





## Practical Pointers For Electrical And Mechanical Men



### Permissible Equipment for Underground Coal Loading Machines

Mining Will Be Made Safer By Use of More Permissible Electric  
Equipment—Loaders Must Not Endanger  
Lives or Mines

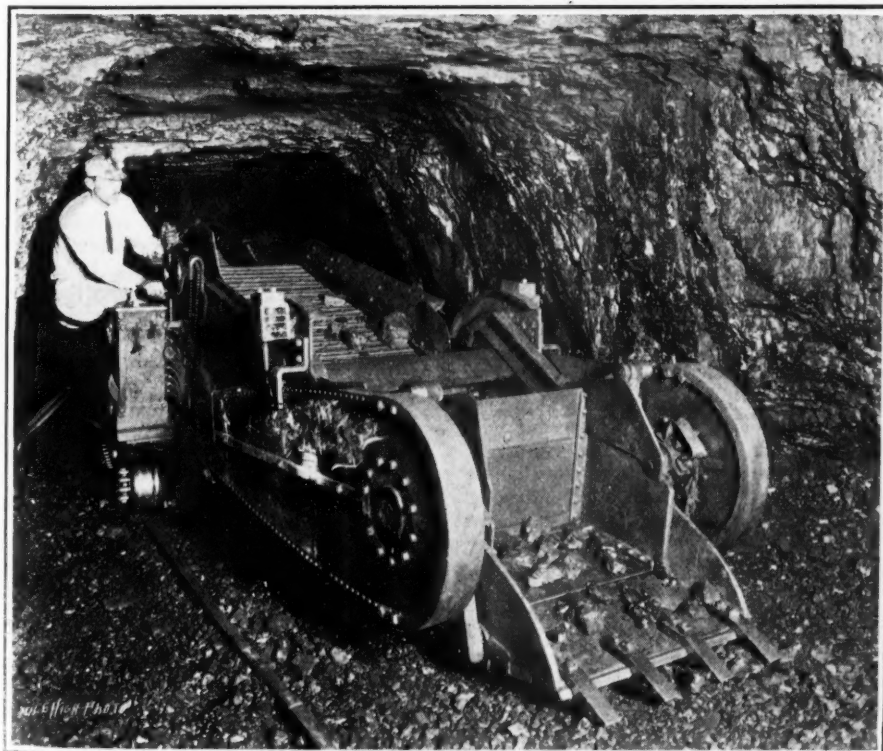
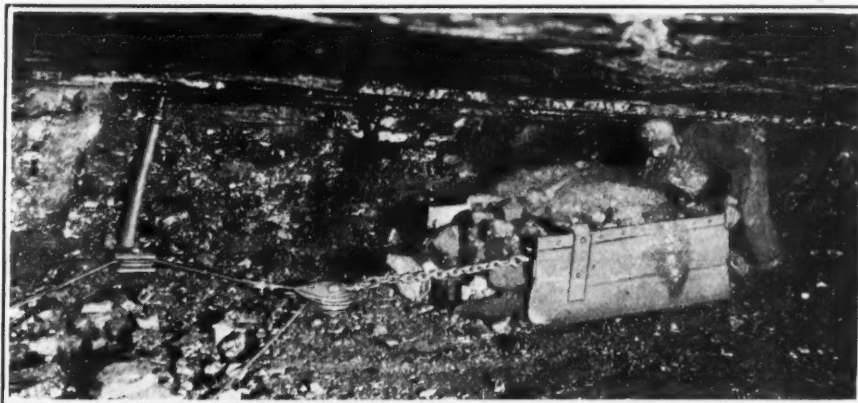
CHARLES M. MEANS  
Consulting Engineer,  
Pittsburgh, Pa.

**U**NDERGROUND coal loading machines are destined in the very near future to come into general use in the production of coal. The application of loading machines will follow in the wake of undercutting machines and electric locomotives. Just what particular type of machine will survive cannot be determined. Neither is it possible to forecast mining methods that will best fit the changed system of loading.

Electricity has thoroughly established its adaptability for operating mechanical equipment of various kinds used in coal mining. When electricity was first introduced in mines, it

created a certain hazard because the sparks and open arcs will ignite gas or coal dust. However, increased knowledge of the behavior of electricity has made it possible to so design and operate equipment that this difficulty has practically disappeared insofar as mining machines and storage-battery locomotives are concerned.

Electrically operated mining machines of various types, storage-battery locomotives and certain other devices have been perfected so that they are



**Loading Machines Must Be Safe from Fire and Explosion**

The capital investment in a loading machine is high; therefore every provision must be made to keep it in operation as much as possible. It must also be safe so that all hazards of destruction will be practically eliminated.

#### An Old-Fashioned Way to Load Coal

The need of a mechanical loading machine probably came from such a suggestion as this. The demand grew from the desire to get the coal out quickly at low cost per ton.

now passed as permissible by the U. S. Bureau of Mines. Equipment so designed as to be passed as permissible does not mean that it is supposed to be operated where there is explosive gas or coal dust, but does mean that should such a condition be encountered the possibility of explosion is practically eliminated if the equipment has been properly maintained. It is now generally recognized that any device of this character used near the face of any mine where such conditions exist should be of the permissible type.

When we consider coal-loading machines we are dealing with a class of equipment that should be surrounded with all the safeguards that are used for other equipment under similar conditions. A loading machine is required to work close to the face where the actual conditions can only be determined from day to day if the work is advancing. If the actual mining is retreating, danger is also present due to roof disturbance and a possible liberation of a pocket of gas. Dust is usually in suspension and may be of such quantity and character as to be a serious hazard.

Before coal loading machines can be universally applied, they too must be fitted with permissible motors, controllers, wiring, etc., if a reasonable degree of freedom from accidents is to be obtained. Such electrical equipment has not been placed on the market as yet, but when a fair degree of standardization of loading machines has been attained it will no doubt be available. The development of permissible electrical equipment suitable for operating loading machines would be along fairly well standardized lines. With requirements clearly defined, no special problem will be involved in manufacture.

Until such a time as permissible equipment is made available for loading machines, their development will be retarded and their application limited to districts where explosive gas and dust is not likely to exist. As our mines get deeper the demand for permissible equipment will increase and the time will come in the not far distant future when all electrically operated mine equipment not used in intake air must be of the permissible type.

### Electric Current Explained By Ventilation Analogy

As a rule technical writers employ the usual hydraulic analogy to explain the fundamental principles of the simple electrical circuit. However, as colliery electricians and others employed in mines usually have a knowledge of ventilation, an analogy comparing similarities between electricity and mine ventilation may be more helpful. But of course, analogies should always be carefully used, as they seldom prove correct if carried beyond certain limits. The hydraulic analogy serves its purpose up to a point, and that of ventilation may do the same, but beyond these limits, reference to either is unsafe.

#### Potential Like Water Gage

In order to force a current of air through an airway, it is necessary that a difference of pressure exist between the inlet and the outlet. In a similar sense it is also necessary to produce a difference of electrical potential or pressure between two points in an electric circuit so that a current may be transmitted from one point to another. Let us assume downcast and upcast shafts of a mine connected by an airway. At a point between the two shafts is a door which is closed. It should be distinctly understood, however, that references are made to conditions of pressure and current only. With a fan running and the door closed, there is a difference of pressure between the two sides of the door equal to the water-gage of the fan under the particular conditions, assuming that there is no leakage.

If the door is opened a current of air begins to circulate from the downcast shaft, through the airway, to the upcast shaft. There is no longer a difference of pressure between opposite sides of the doorway, but it is transferred between the top of the downcast and the inlet to the fan on the top of the upcast.

Further, it will be noticed that, whereas with the airdoor closed no difference of pressure existed between

points on either one side or the other, now there is a definite drop of pressure between any two points in the air course. This drop in pressure is caused by the resistance offered to the current of air by the surface of the airway, and the total of all the pressure-drops between all points is equal to the water-gage pressure forcing the current through the mine. Assuming the size of the airway to remain the same, an increase of pressure would cause an increase of air with a corresponding increase of pressure drop between points, the total of which must always equal the water-gage pressure at the inlet of the fan. This fact is important, as it has a striking parallel with relation to conditions in a simple electric circuit.

#### Current Increases with Airway

Again, if the airway is increased in section, while the pressure is assumed to remain constant, a larger volume of air will pass while the drop in pressure from point to point remains as before the airway was increased in section.

In these instances we have conditions typical of electric circuits. (A) If the water-gage pressure is increased for a given airway the volume of air will increase, as will also the pressure drop from point to point along the airway. (B) Resistance is offered to the air-current by the rubbing surface of the airway. If the pressure is kept constant, while the section of the airway is increased, the current will increase, and if the cross-section of the airway is reduced the current of air will also be reduced.

Referring now to an ordinary electric cell, let us assume a simple circuit connected to its terminals. The circuit is open by a piece of insulation so that no current can pass along the wire. The wire represents the airway, and the insulation takes the place of the door in the ventilation analogy. There is a certain difference of electrical pressure between the two points on either side of the insulator. The distribution of pressure in the electric circuit is similar to that when the air-door was closed: there is no difference of pressure between points on the wires connected to the same terminal of the cell, but the pressure between a point on one wire and another on the other wire is the same as that between opposite ends of the insulator.

#### Like Opening Door in Airway

If the insulator is removed and a continuous path is provided, a current will flow through the wire from one terminal to the other. This is equivalent to opening the air-door and allowing the difference of pressure to send an air-current through the airway, the fan acting like a huge cell from which the current is taken and returned. The assumption that a flow of current takes place in an electric current is justifiable, and that it also has direction is made evident from the fact that certain kinds of measuring instruments will read backwards or forwards, depending upon the direction of the current. It is very convenient to be able to refer to an electric current as flowing in a wire, because it assists the student to grasp more easily the theory of the subject.

Assuming the insulator to be re-

moved, it is now necessary to compare the simple electric circuit with the ventilating circuit, when the door in the airway is open. As soon as the insulator is removed, and the current starts to flow, the full difference of pressure between the two ends of the insulator vanishes and is transferred to the terminals of the cell, assuming this pressure remains constant.

This is just what happened when the air-door was opened. The full difference of pressure was transferred to the top of the two shafts. Further, the wire offers resistance to the passage of current, and consequently, a drop in pressure exists between any two consecutive points in the circuit. The total drop through the wire is equal to the difference of pressure necessary to force the current through the circuit. This is the pressure between the two terminals of the cell and corresponds to the difference of pressure between the tops of the ventilation shafts when a current of air was passing. An important point is that the current is not used in the circuit in the sense of being consumed. The amount returning to the negative terminal of the cell is the same as that which leaves the positive terminal, just as in the case of the airway, where the amount of air entering the downcast shaft is equal to that leaving the upcast.

#### Work Done Against Resistance

A definite amount of work is done in both cases, the one in overcoming the resistance offered to the air-current by the rubbing surface of the airway, and the other in forcing a current against the resistance of the wire. The drop in pressure from point to point in both represents work being done. Finally, we have the same two principles referred to regarding the airway: (A) If the pressure is increased for a given circuit, the current through the wire will also increase, as will the pressure-drop from point to point along the wire.

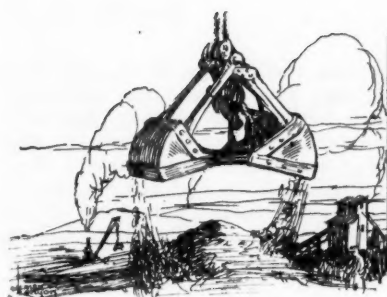
(B) Resistance is offered to the electric current by the wire. Assuming the pressure to be constant, if the cross-section of the wire is increased, a larger current will flow, and if the cross-section of wire is reduced the current flowing will be less. Hence, we see that the simple ventilating theory has much in common with the electric principles.

ENGINEER.

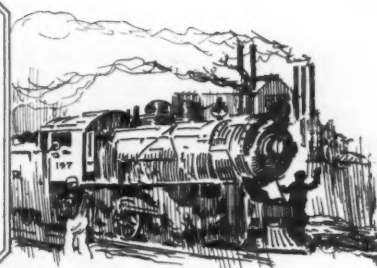
### Lubrication of Locomotive Motor Bearings

High-grade oil should be used for lubricating the sleeve bearings of locomotive motors. The common practice is to use one or two gills of oil at each oiling period, which is on the average every seven days. The best results are obtained by pouring the oil into the separate oil-well chamber so that it must feed up through the waste to the axle. By this means dirt in the oil does not get to the bearings, the waste acting as a screen or filter. If the oil is poured on top of the waste, it will tend to flood the bearing and thus be wasted. It is not economy to try to operate with too little oil as any apparent saving is more than offset by the resultant short life of the bearings.





# Production And the Market



## Continued Excess of Consumption Over Output Hastens Inevitable Upturn in Soft-Coal Trade

The seeming anomaly of production at a level far below consumption and with demand and prices practically at rock bottom continues to prevail in the soft-coal markets of the country. Nevertheless, the long-deferred but inevitable upturn is slowly but surely approaching. A number of brave prophets in industrial affairs say that the present slowdown is only a breathing spell preparatory to a business revival in the autumn. Some irrepressible optimists profess even now to see the first faint gleams of sunlight through the dark clouds that have enshrouded the trade for many weeks. There is no question, however, that the trade is steadily settling toward a more stable basis, that a firm foundation is being laid for a revival—regardless of the forebodings of the incurable disciples of gloom. Meanwhile buying, such as it is, is largely of a hand-to-mouth character, even those whose stockpiles are no longer big showing no alacrity about entering into fuel contracts while there is the remotest possibility of prices going lower.

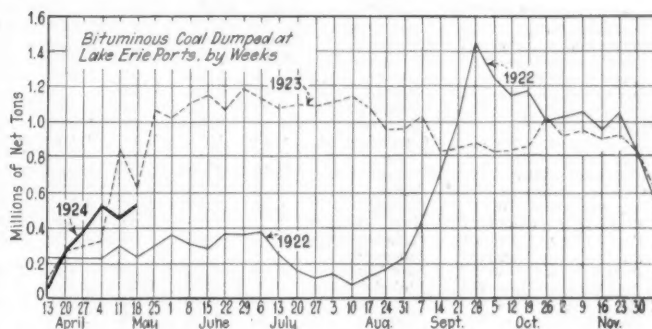
### Shipping Board Bids as Market Indicator

The surplus of empty cars continues to swell steadily to a yawning void that fairly seems to ache for the initiation of the reported government scheme to set a summer coal-buying plan in motion. Shipments to tide-water as well as inland are at a low ebb and the demand for lake tonnage is markedly weak. Much light is thrown on market conditions by the bids submitted May 16 to the U. S. Shipping Board for supplying and delivering alongside vessels in New York Harbor 1,430 gross tons of bituminous coal running not less than 14,500 B.t.u. Four bids were received, the prices ranging from about \$1.92 to \$2.19 per net ton f.o.b. mine, compared with \$1.92 to \$2.77 in the bids submitted May 12 on 216,000 tons.

Coal Age Index of spot prices of bituminous coal

again failed to register any change during the last week, standing at 169 on May 19, the corresponding price being \$2.05.

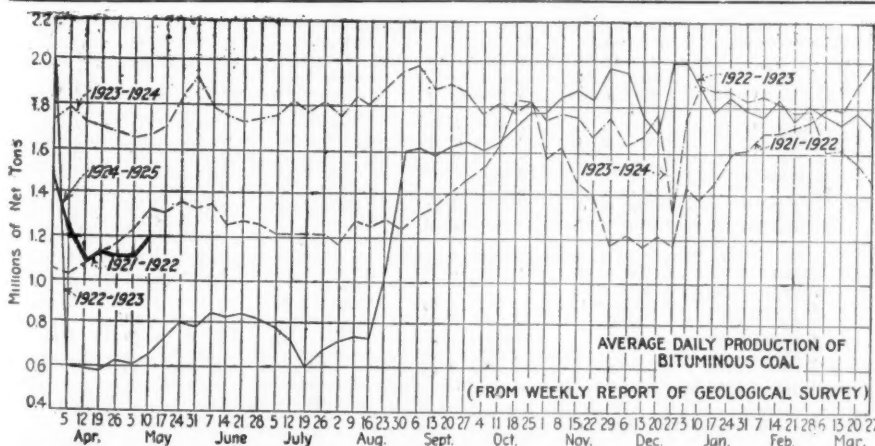
Dumpings at Hampton Roads for all accounts during the week ended May 15 amounted to 261,732 net tons, as compared with 293,849 tons dumped during the preceding week. Coal dumped at Lake Erie ports during the week ended May 17, according to the Ore & Coal



Exchange, were as follows: Cargo, 523,499 net tons; fuel, 35,697 tons. The totals for the previous week were 450,570 tons of cargo coal and 32,726 tons of fuel coal.

For the first time since March the production of bituminous coal passed the 7,000,000-ton mark during the week ended May 10, when, according to the Geological Survey, the output was 7,121,000 net tons. This compares with 6,832,000 tons produced during the previous week. There also was a marked increase in the output of anthracite, 1,924,000 net tons having been produced, compared with 1,616,000 tons during the week ended May 3.

Despite the upturn in anthracite production, due largely to the settlement of local labor disturbances, the hard-coal market shows no diminution in strength.



### Estimates of Production

(In Net Tons)

#### BITUMINOUS

	1923	1924
April 26.....	10,103,000	6,724,000
May 3 (a).....	10,061,000	6,832,000
May 10 (b).....	10,175,000	7,121,000
Daily average.....	1,696,000	1,187,000
Cal. yr. to date (c).....	197,272,000	176,281,000
Daily av. to date.....	1,767,000	1,581,000

#### ANTHRACITE

April 26.....	2,116,000	1,205,000
May 3.....	2,021,000	1,616,000
May 10.....	1,903,000	1,924,000
Cal. year to date.....	37,518,000	33,173,000

#### COKE

May 3 (a).....	407,000	205,000
May 10 (b).....	401,000	177,000
Cal. yr. to date (c).....	7,173,000	5,065,000

(a) Revised from last report. (b) Subject to revision. (c) Minus one day's production to equalize number of days in the two years.

Demand for the most-wanted sizes, particularly stove, is still greater than the supply, but the most pressing demands are being taken care of when the consumer is willing to take some of the less wanted sizes along with the popular favorites.

### No Life in Midwest Yet

There has been practically no activity in the Chicago market during the last week. Domestic sizes, as heretofore, have been difficult to move and steam sizes have been in medium demand only. Mines running have been doing so very largely on railroad orders. Prices appear to be attractive enough to the purchasing agent; what is holding him back is a well defined uncertainty as to the future. On this low market it is surprising that there is not more price cutting, even on the better favored coals of the producing districts. The tendency to hold prices firm probably is a natural development arising from the large consolidation of coal properties already effected and to be effected a little later on in the season. It might be explained, too, by April balance sheets, now trickling into the front offices.

Eastern coals continue their inroads on the territory of the Illinois and Indiana mines. A substantial tonnage of

smokeless coal is moving into the Middle West and more is booked to move in later on. The demand for anthracite is reasonably good. Extra activity on eastern Kentucky coal is explained by the new and favorable freight rates recently published covering shipments from eastern Kentucky mines to points in Illinois, Iowa and Minnesota.

The past week has seen just a slight movement of domestic sizes from the Williamson and Franklin County field of Illinois. It is not an early storage movement, however; it is just a case of where unseasonable weather in two or three places cleaned out the dealers. In a general way there is no change. All mines have unbilled coal of all sizes on hand, excepting No. 2 nut and the smaller sized nut and screenings. No. 2 nut is unusually scarce throughout all fields and screenings are not plentiful. In most fields the mines are crushing mine run to make screenings.

The movement of domestic coal at St. Louis is practically at a standstill. Neither high nor low grade is being bought and wagonload steam is decidedly sluggish. It is expected that the storage of coal will begin in June this year. Country domestic is unusually quiet. There is a little country demand for steam sizes, but locally outside of the demand for screenings, which is good and which exceeds the supply, there is nothing out of the ordinary.

### Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

Low-Volatile, Eastern		Market Quoted	May 21 1923	May 5 1924	May 12 1924	May 19 1924†
Smokeless lump	Columbus...		\$6.25	\$3.40	\$3.40	\$3.35@ \$3.60
Smokeless mine run	Columbus...		4.05	2.25	2.25	2.20@ 2.35
Smokeless screenings	Columbus...		3.70	1.85	1.85	1.75@ 2.00
Smokeless lump	Chicago...		6.10	3.10	3.10	3.00@ 3.25
Smokeless mine run	Chicago...		4.10	2.00	2.00	2.00
Smokeless lump	Cincinnati...		6.25	3.35	3.50	3.50
Smokeless mine run	Cincinnati...		4.25	2.05	1.85	1.75@ 2.00
Smokeless screenings	Cincinnati...		4.25	1.75	1.75	1.50@ 2.00
*Smokeless mine run	Boston...		6.85	4.40	4.40	4.35@ 4.60
Clearfield mine run	Boston...		2.60	2.00	1.95	1.65@ 2.40
Cambria mine run	Boston...		3.25	2.55	2.35	2.25@ 2.75
Somerset mine run	Boston...		3.00	2.30	2.10	2.00@ 2.50
Pool 1 (Navy Standard)	New York...		3.75	2.85	2.85	2.60@ 3.00
Pool 1 (Navy Standard)	Philadelphia...		3.80	3.00	3.00	2.75@ 3.25
Pool 1 (Navy Standard)	Baltimore...					
Pool 9 (Super. Low Vol.)	New York...		2.90	2.20	2.20	2.00@ 2.40
Pool 9 (Super. Low Vol.)	Philadelphia...		2.85	2.20	2.20	2.00@ 2.45
Pool 9 (Super. Low Vol.)	Baltimore...		2.75	1.80	1.80	1.75@ 1.95
Pool 10 (H.Gr. Low Vol.)	New York...		2.50	1.90	1.90	1.75@ 2.00
Pool 10 (H.Gr. Low Vol.)	Philadelphia...		2.35	1.85	1.85	1.70@ 2.00
Pool 10 (H.Gr. Low Vol.)	Baltimore...		2.30	1.65	1.65	1.60@ 1.75
Pool 11 (Low Vol.)	New York...		2.05	1.55	1.60	1.50@ 1.75
Pool 11 (Low Vol.)	Philadelphia...		2.05	1.50	1.50	1.30@ 1.70
Pool 11 (Low Vol.)	Baltimore...		2.00	1.55	1.55	1.50@ 1.65

High-Volatile, Eastern		Market Quoted	May 21 1923	May 5 1924	May 12 1924	May 19 1924†
Pool 54-64 (Gas and St.)	New York...		1.85	1.50	1.50	1.40@ 1.65
Pool 54-64 (Gas and St.)	Philadelphia...		2.05	1.55	1.55	1.45@ 1.70
Pool 54-64 (Gas and St.)	Baltimore...		1.80	1.45	1.45	1.40@ 1.55
Pittsburgh sc'd gas	Pittsburgh...		2.85	2.40	2.40	2.30@ 2.50
Pittsburgh gas mine run	Pittsburgh...			2.10	2.10	2.00@ 2.25
Pittsburgh mine run (St.)	Pittsburgh...		2.00	1.85	1.85	1.75@ 2.00
Pittsburgh slack (Gas)	Pittsburgh...		1.85	1.35	1.35	1.30@ 1.40
Kanawha lump	Columbus...		3.25			
Kanawha mine run	Columbus...		2.20			
Kanawha screenings	Columbus...		1.75			
W. Va. lump	Cincinnati...		3.10	2.00	2.15	2.00@ 2.25
W. Va. gas mine run	Cincinnati...		1.80	1.35	1.40	1.25@ 1.60
W. Va. steam mine run	Cincinnati...		1.80	1.35	1.40	1.25@ 1.60
W. Va. screenings	Cincinnati...		1.65	.90	1.05	1.00@ 1.10
Hocking lump	Columbus...		2.75	2.45	2.45	2.25@ 2.60
Hocking mine run	Columbus...		1.95	1.60	1.60	1.50@ 1.75
Hocking screenings	Columbus...		1.45	1.30	1.35	1.30@ 1.50
Pitts. No. 8 lump	Cleveland...		2.95	2.40	2.40	2.10@ 2.75
Pitts. No. 8 mine run	Cleveland...		2.15	1.85	1.90	1.85@ 1.90
Pitts. No. 8 screenings	Cleveland...		1.65	1.55	1.50	1.40@ 1.60

Midwest		Market Quoted	May 21 1923	May 5 1924	May 12 1924	May 19 1924†
Franklin, Ill. lump	Chicago...		\$3.80	\$2.75	\$2.75	\$2.50@ \$3.00
Franklin, Ill. mine run	Chicago...		3.10	2.35	2.35	2.25@ 2.50
Franklin, Ill. screenings	Chicago...		1.80	2.15	2.15	2.10@ 2.25
Central, Ill. lump	Chicago...		2.60	2.60	2.60	2.50@ 2.75
Central, Ill. mine run	Chicago...		2.10	2.10	2.10	2.00@ 2.25
Central, Ill. screenings	Chicago...		1.85	1.90	1.90	1.80@ 2.00
Ind. 4th Vein lump	Chicago...		3.35	2.85	2.85	2.75@ 3.00
Ind. 4th Vein mine run	Chicago...		2.85	2.35	2.35	2.25@ 2.50
Ind. 4th Vein screenings	Chicago...		1.85	1.95	1.95	1.90@ 2.00
Ind. 5th Vein lump	Chicago...		2.85	2.35	2.35	2.25@ 2.50
Ind. 5th Vein mine run	Chicago...		2.10	2.10	2.10	2.00@ 2.25
Ind. 5th Vein screenings	Chicago...		1.55	1.80	1.80	1.75@ 1.85
Mt. Olive lump	St. Louis...			2.85	2.85	2.75@ 3.00
Mt. Olive mine run	St. Louis...			2.50	2.50	2.50
Mt. Olive screenings	St. Louis...			2.00	2.00	2.00
Standard lump	St. Louis...		2.25	2.15	2.15	2.00@ 2.35
Standard mine run	St. Louis...		1.80	1.95	1.95	1.90@ 2.00
Standard screenings	St. Louis...		1.50	1.80	1.80	1.75@ 1.90
West Ky. lump	Louisville...		2.60	2.35	2.35	2.25@ 2.50
West Ky. mine run	Louisville...		1.30	1.60	1.65	1.50@ 1.85
West Ky. screenings	Louisville...		1.60	1.65	1.60	1.50@ 1.75
West Ky. lump	Chicago...		2.60	2.25	2.25	2.00@ 2.50
West Ky. mine run	Chicago...		1.80	1.60	1.60	1.50@ 1.75

South and Southwest		Market Quoted	May 21 1923	May 5 1924	May 12 1924	May 19 1924†
Big Seam lump	Birmingham...		2.70	2.80	2.80	2.70@ 2.90
Big Seam mine run	Birmingham...		2.05	2.00	2.00	1.75@ 2.25
Big Seam (washed)	Birmingham...		2.35	2.20	2.20	2.00@ 2.40
S. E. Ky. lump	Chicago...		3.75	2.25	2.25	2.00@ 2.50
S. E. Ky. mine run	Chicago...		2.35	1.60	1.60	1.25@ 2.00
S. E. Ky. lump	Louisville...		3.75	2.10	2.15	2.00@ 2.35
S. E. Ky. mine run	Louisville...		2.50	1.50	1.50	1.25@ 1.75
S. E. Ky. screenings	Louisville...		1.90	1.05	1.10	1.00@ 1.25
S. E. Ky. lump	Cincinnati...		3.35	2.05	2.35	2.25@ 2.50
S. E. Ky. mine run	Cincinnati...		1.80	1.35	1.35	1.25@ 1.50
S. E. Ky. screenings	Cincinnati...		1.60	.85	1.05	.80@ 1.10
Kansas lump	Kansas City...		3.85	4.50	4.50	4.50
Kansas mine run	Kansas City...		3.25	3.25	3.50	3.50
Kansas screenings	Kansas City...		2.60	2.50	2.50	2.50

\* Gross tons, f.o.b. vessel, Hampton Roads.

† Advances over previous week shown in heavy type, declines in italics

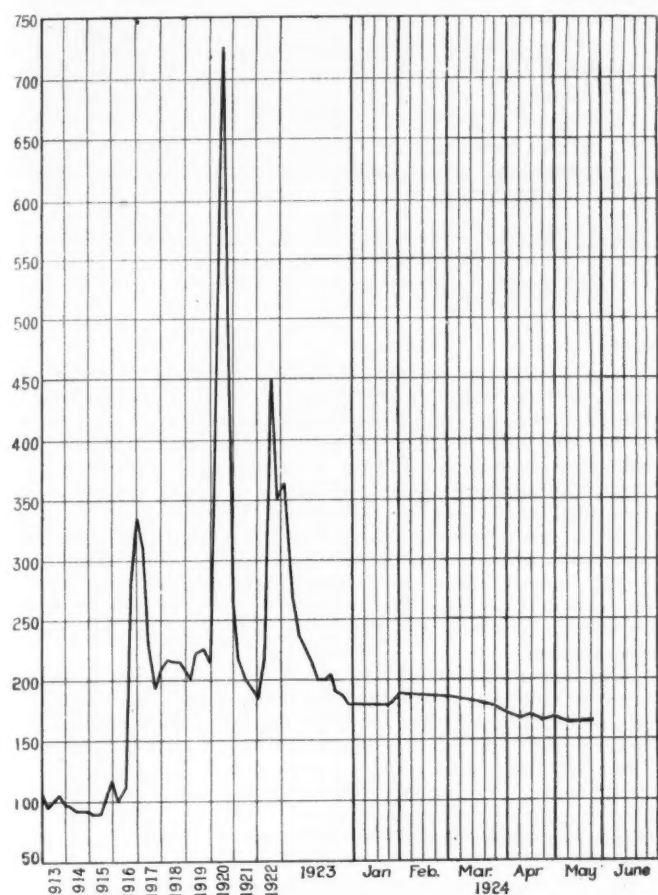
‡ Strike on.

### Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	May 21, 1923		May 12, 1924		May 19, 1924†	
			Independent	Company	Independent	Company	Independent	Company
Broken	New York	\$2.34		\$7.75@ \$8.35	\$8.50@ \$8.60	\$8.00@ \$8.75	\$8.50@ \$9.00	\$8.00@ \$8.75
Broken	Philadelphia	2.39		7.90@ 8.10		8.60@ 8.75		8.60@ 8.75
Egg	New York	2.34	\$8.50@ \$11.00	8.00@ 8.35	8.75@ 9.25	8.35@ 8.75	9.00@ 9.25	8.35@ 8.75
Egg	Philadelphia	2.39	9.25@ 9.50	8.10@ 8.35	8.35@ 9.50	8.70@ 8.75	8.35@ 9.50	8.70@ 8.75
Egg	Chicago*	5.06	12.00@ 12.50	7.20@ 8.25	7.68@ 7.77	7.73@ 7.81	7.68@ 7.77	7.73@ 7.81
Stove	New York	2.34	8.50@ 11.00	8.00@ 8.35	9.00@ 9.50	8.35@ 9.00	9.00@ 9.50	8.35@ 9.00
Stove	Philadelphia	2.39	9.25@ 9.50	8.15@ 8.35	8.70@ 9.60	8.75@ 8.95	8.70@ 9.60	8.75@ 8.95
Stove	Chicago*	5.06	12.00@ 12.50	7.35@ 8.25	8.03@ 8.17	7.94@ 8.14	8.03@ 8.17	7.94@ 8.14
Chestnut	New York	2.34	8.50@ 11.00	8.00@ 8.35	8.75@ 9.25	8.35@ 8.85	8.75@ 9.25	8.35@ 8.85
Chestnut	Philadelphia	2.39	9.25@ 9.50	8.15@ 8.35	8.75@ 8.85	8.70@ 9.60	8.75@ 8.85	8.70@ 9.60
Chestnut	Chicago*	5.06	12.00@ 12.50	7.35@ 8.35	7.90@ 8.03	7.81@ 7.99	7.90@ 8.03	7.81@ 7.99
Range	New York	2.34		8.30		8.60		8.60
Pea	New York	2.22	6.30@ 7.25	6.00@ 6.30	5.50@ 6.00	5.50@ 6.00	5.50@ 6.00	5.50@ 6.00
Pea	Philadelphia	2.14	7.00@ 7.25	6.15@ 6.20	5.75@ 6.25	5.75@ 6.00	5.75@ 6.25	5.75@ 6.00
Pea	Chicago*	4.79	7.00@ 8.00	5.49@ 6.03	5.36	5.36@ 5.91	5.36	5.36@ 5.91
Buckwheat No. 1	New York	2.22	2.25@ 3.50	3.50@ 4.15	2.35@ 3.00	3.00@ 3.15	2.35@ 3.00	3.00@ 3.15
Buckwheat No. 1	Philadelphia	2.14	3.00@ 3.50	3.50	2.50@ 3.00	3.00	2.50@ 3.00	3.00
Rice	New York	2.22	1.50@ 2.50	2.50	1.90@ 2.25	2.00@ 2.25	1.90@ 2.25	2.00@ 2.25
Rice	Philadelphia	2.14	2.00@ 2.50	2.50	2.00@ 2.25	2.25	2.00@ 2.25	2.25
Barley	New York	2.22	1.00@ 1.50	1.50	1.50@ 1.75	1.50	1.50@ 1.75	1.50
Barley	Philadelphia	2.14	1.15@ 1.50	1.50	1.50	1.50	1.50	1.50
Birdseye	New York	2.22		1.60		1.60		1.60

\* Net tons, f.o.b. mines. † Advances over previous week shown in heavy type, declines in italics.





Coal Age Index of Spot Prices of Bituminous Coal F.O.B. Mines

	1924		1923	
	May 19	May 12	May 5	May 21
Index .....	169	169	169	221
Weighted average price .....	\$2.05	\$2.05	\$2.05	\$2.63

This diagram shows the relative, not the actual, prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913-1918," published by the Geological Survey and the War Industries Board.

### Kentucky Full of "No Bills"

Business continues generally quiet with the coal trade of Kentucky, neither the eastern nor western fields having much business in hand, while there is considerable unsold coal reported on tracks, at mines, at marketing points, and rolling, due to a general lack of orders. Cold weather over the week has resulted in just a few orders for small lots of coal, but retailers are cleaning up yard stocks and placing very little business. Utility, industrial and lake buying are all reported slow. Railroad consumption is a little below normal.

The general outlook for the next thirty to sixty days is poor, as competition is very keen, business is being done on very narrow margins, and the trade is anything but satisfactory. Prices are unchanged. The western Kentucky strike goes ahead uneventfully with the non-union mines producing more than enough to glut the market.

The movement of coal from West Virginia was greatly retarded for a few days by swollen streams throughout the state. All grades of smokeless are in a somewhat better market position. High volatile splint lump prices are a little weaker, but mine run is in a little better position than it was. As not much coal is being prepared, slack is becoming somewhat scarce.

### Northwest Quiet Too

Duluth trade is very dull. Little coal of any kind is moving in. A slight spell of cold weather has been the only bright spot for the coal men. Prices still hold in both hard and soft, but some docks are being accused of cutting from 50c. to \$1 in order to obtain a few of the large contracts.

The trouble with hard coal is that it is expected that smokeless will go big here next winter, and the spread between hard and soft is so great that it is worth the consumer's while to buy smokeless. This is the frank opinion of coal men, and those who used smokeless this winter reported fine results.

Figures of coal on Head-of-the-Lakes docks at the first of the month show in all 2,900,000 tons of soft and 145,000 tons of hard. Of the soft, 1,700,000 is free coal. Shipments for this month will show a marked falling off from those of last month. The rate on lake coal from lower lake ports to Duluth has been set at 40c. a ton. This is 5c. below last year.

The coal trade at Milwaukee is very quiet. Naturally there is little demand for anthracite at this time of the year, but there should be a better movement of soft coal to industries. Jobbers who have canvassed the interior say there are no stocks of any consequence on hand, yet consumers continue to hold off. Coal keeps coming by lake in fair volume. Thus far this season the receipts of anthracite aggregate 68,576 tons and of soft coal 175,699 tons. The movement is bound to slacken when storage becomes a problem.

### Western Trade Drags

There is little activity through the Southwestern district. A substantial surplus accumulated by independents during the shutdown of mines controlled by members of the Southwestern Interstate Coal Operators' Association is increasing. A few mines with small industrial contracts have resumed operations since the signing of the new agreement. The Western Coal & Mining Co. has reopened to supply the Missouri Pacific, but most operators are waiting for a market.

Kansas lump is \$4.50; nut, \$4; mine run \$3.50 and screenings, \$2.50. Arkansas semi-anthracite lump is \$6 and mine run \$3.25@3.50. No slack is available. Henryetta (Okla.) lump is \$5.50; nut, \$3.75; mine run \$3.50; and screenings, \$2.50.

In Colorado the coal market continues to drag. Industries are buying very little and the domestic consumption has fallen off considerably. Mines worked on an average of 22 hours per mine last week. Prices are unchanged.

Utah coal mines are working about two days a week. Mine-controlled retail agencies are stocking lump, but this total is small. Some of the operators are unable to supply the demand for slack, due to the light movement on the larger sizes. Prices remain firm. Operators declare they have reached bed rock. Whether dealers will offer storage rates this year has not been decided yet. Mine prices: lump, \$3.50; domestic lump, \$3; egg, \$2.50; nut, \$2.25; screen slack, \$2; slack, \$1.50.

### Trade at Cincinnati on Even Keel

Lake business at Cincinnati is swinging back to its natural channel and business generally is beginning to run on a fairly even keel. Demand for steam coal is a little better, lending a steadying influence. Large sizes are a little firmer due to the pressure, perhaps that has been put upon the price of the resultant. There has been no change in the status of the specialized coals. In smokeless the firmness is all found in the lump and egg with production lagging a little behind demand. There is no change in the retail situation. The high water has interfered a bit with the bringing down of river coal and this even with a reduced tonnage because of the Kanawha shutdown.

While there are inquiries here and there for commercial tonnage, the steam trade at Columbus is dull. Consumers are content to buy in the open market, confident that low prices will continue for some time. Operators are not inclined to contract at present figures and outside of certain small renewals there is little doing in that line. Railroad contracts have been closed and the price for Hocking mine run is around \$2. The amount of distress coal on the local market is not as large as formerly, although a fair tonnage is being picked up by utilities and other large steam users. Prices continue irregular and weak and more mines in the Hocking Valley field are closing down. Domestic trade also is quiet. In the Lake trade quite a few vessels are moving from the lower lake ports to the head of navigation. Inquiries for lake tonnage are almost entirely lacking in marked contrast with previous seasons.

The market at Cleveland shows no revival from the lethargy that has prevailed of late. Production in the east-

ern Ohio No. 8 field in the week ending May 10 increased 41,000 tons over the preceding week. The total output was 280,000 tons, or about 40 per cent of potential capacity. Despite increased output, due to lake movement, slack prices hold firm at recent levels.

Line demand continues poor in the Pittsburgh market. No extended deliveries are being inquired for and producers find it useless to attempt to negotiate such business. The market is simply one of small spot lots, which are closely contested for, but with prices down to a low level there is no general declining tendency in prices. There are reports of some lake coal being loaded on track, awaiting sales. There are no regular negotiations on lake coal.

A slight improvement was noted during the week in market conditions in central Pennsylvania, production gaining a little over April. More orders are being booked than for a number of weeks, but these are going to operators with the lower production cost. The loadings for the week ending May 10 were 11,732 car loads, against 10,864 car loads for the previous week. For the period of May to the 10th, the loadings were 16,978 cars, against 14,133 in April to the same date. Prices show little fluctuation.

The trade at Buffalo continues featureless. Slack coal, which for a time was fairly strong, is now about in line with other sizes. Considerable West Virginia and Kentucky coal is selling here the price being cut to make up for the higher freight.

### Dullness Again Enshrouds New England

The market for steam coals in New England continues extremely dull. Prices have not shown the firmness expected a fortnight ago, and in many directions there is an utter lack of buying interest. The staple industries, such as shoes and textiles, are in nowise improved, and reserve stocks are still large enough to preclude purchases of more than scattering amounts.

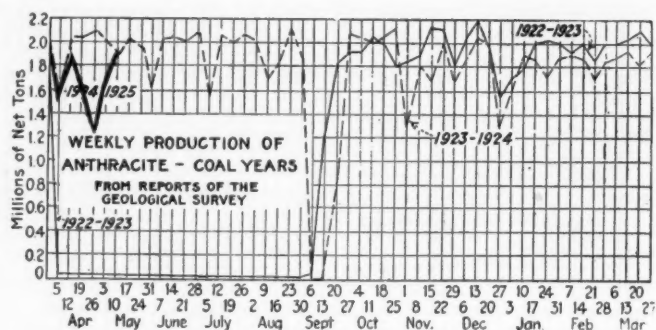
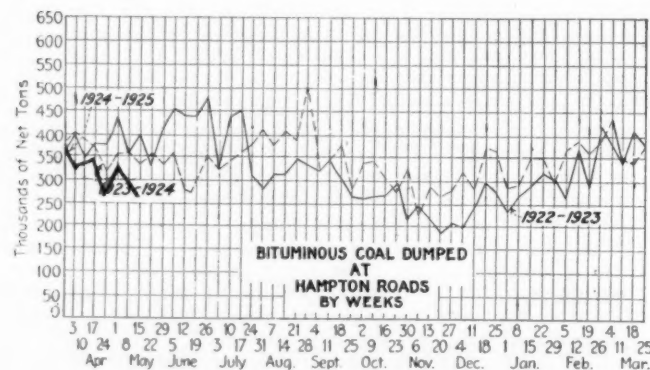
Navy Standard Pocahontas and New River are dragging along at \$4.35@4.60 per gross ton f.o.b. vessel, with no snap to demand. A fair amount of tonnage is moving coastwise on contract, but aside from certain commitments offshore there is little doing for spot shipment. On the whole the range of prices averages 5c. to 10c. less than a week ago, while coals of pool 2 grade have eased off 20c. to 25c.

On cars Boston, Providence, and Portland there is little change; \$5.50 per gross ton appears to be the ruling figure, but occasionally there are rumors of prices 10c. to 15c. less. Practically all the factors have maximum tonnages on their wharves, and some weeks there is an extra push to move coal.

All-rail trade is practically lifeless. Within the tidewater zone there is almost nothing doing via the rail route, and prospects continue decidedly dark.

### Seaboard Markets Verge on Stagnation

New York consumers continue to buy on a hand to mouth basis, apparently unmindful of the future. There are some reports, however, that inquiries are increasing and that the present condition means a much stronger market within the next few months. Inactivity prevails at present, however. Demand is hardly heard of and buyers are hard to find. The New York tidewater market is on the verge of stagnation. Prices are maintained at their present level only because of the absence of coal on demurrage and the reluctance of operators to send coal to tidewater unless



it is on order and selling indications are good. Cars at the piers average 1,100 to 1,200 daily. Activity is lacking at Philadelphia, yet confidence is felt that the turn of the tide is not far off. Industrial activity has slowed down considerably as compared with a month ago, and even then there was much complaint of dullness. Many operators are devoting much time to reshaping the wage policy in an effort to get production costs down to meet competition with non-union mines. Spot prices are fairly stable. Tide shipments remain quiet, with very little coal moving outside of some bunkering. The number of cars at tide is small, as no one is taking any kind of a chance by having coal on demurrage.

Baltimore purchasers are merely buying sufficient to keep them in emergency supplies, but there is very little contracting and practically little storing against future needs. The only consolation in this is that when a demand develops, there will undoubtedly be a need for coal by practically all large users. The export movement has shown a disappointing falling off, though inquiry from Mediterranean and South American points would seem to indicate an early resumption.

The Birmingham market continues weak with inquiry and new business at a low ebb for steam coal, consumers picking up tonnage for immediate use in the spot market, with no inclination to stock. Contracting is slow. Practically all the remaining operators who did not make wage reductions last autumn or on April 1 last put new schedules in effect May 16.

### Anthracite Market Retains Strength

Anthracite demand at New York has not in any way decreased and consumers are just as anxious to have their bins filled as dealers are to fill them. Stove coal leads in strength. Some retail dealers refuse orders for this size alone, but will take orders when other sizes are included. Some quotations for straight independent stove are as high as \$9.75 at the mine, but when taken with other coals the quotations are about 25c. lower. There is plenty of egg and chestnut to be had. Pea coal continues in good demand, considering this market and the better grades of independent product bring full company circular. Consumption has been unusually heavy for this season because of weather conditions and dealers find themselves delivering small orders when they ought to be filling bins. Barley is the strongest of the steam coals with the better grades from independent operations bringing premiums. Buckwheat is easier, while rice maintains its strong position.

A strong demand for stove coal is a notable feature of the Philadelphia market. The situation from the producer's standpoint is better than at this time last month, but there are signs of an easing off. The yards are filling up with all sizes of coal, with most dealers having heavy stocks of nut. The opinion is general that the producing companies will add another 10c. to mine prices, but the thing that is giving the retail trade the most concern is whether their prices shall be advanced.

Output of beehive coke during the week ended May 10 was 177,000 net tons, according to the Geological Survey, compared with a production of 205,000 tons during the previous week.

### Car Loadings

	Cars Loaded —	
	All Cars	Coal Cars
Week ended May 3.....	914,040	127,165
Previous week .....	878,892	117,572
Same week in 1923 .....	961,617	175,482



## Foreign Market And Export News

### British Coal Market Stagnant; Miners' Wages Increased

The British coal markets are stagnant on account of the threatened strike of tipplers and trimmers, according to a radioletter to the Department of Commerce from Commercial Attaché Walter S. Tower, London, but a stoppage has been arrested by action of the Ministry of Labor. Prices are slightly firmer, reflecting the Ruhr labor trouble. The freight markets are dull and unchanged.

The recent findings of the official court of inquiry into the coal industry having been favorable to the miners, mine owners and union officials reached an agreement May 15 on higher pay.

The main point of the settlement is that the general minimum wage is to be increased from 20 per cent above the pre-war rate to 33½ per cent above. The standard of profits for owners is to be 15 per cent of the standard wage instead of 17 per cent as at present. The surplus, if any, is to be divided 88 per cent to the men and 12 per cent to the owners, instead of 83 and 17, as at present.

After the meeting A. J. Cook, general secretary of the Miners' Federation, said his Executive Committee would recommend that the men accept the agreement, though he was not satisfied it met with their full requirements.

Production by British collieries during the week ended May 3, a cable to *Coal Age* states, was 5,685,000 tons, according to the official reports. This compares with 4,049,000 tons in the week ended April 26.

#### Lethargy Grips Hampton Roads; Stocks Low; Prices Hold

Business at Hampton Roads is slow with foreign movement slumping and other lines of trade barely holding their own. The opening of lake shipments promised to boost coastwise trade, but little improvement has been shown. Stocks at the piers are lower than at any time in the year, and a state of

lethargy has settled down on the piers. Prices appear to hold their own, however, having reached what shippers term the rock bottom.

The tone of the market is dull. Contracts are absent, and general activity in the trade has reached a low level. Some of the dullness is attributed to seasonal conditions, and the trade is not exercised over the let-up in movement.

#### French Market Holds Its Own; Changes Are Insignificant

The situation in the French market is unchanged as far as French coals are concerned, except that production has declined somewhat. The demand for household fuel is practically at a standstill, consumers waiting for the summer rates before placing their orders.

With the sterling rate under 70 fr., British coals are offered at more reasonable prices. If the decline should continue, they may be within hailing distance in price to the French product and even cheaper than indemnity fuels.

Deliveries of indemnity fuels are averaging 42,700 tons daily, the total for April being estimated at 1,200,000 tons. Supplies of coke to the O.R.C.A. are at the rate of about 20,000 tons a day.

The M.I.C.U.M. agreement with the Ruhr operators was extended on April 15 to June 15, but may be terminated within that period if reparation payments are regulated before that date, according to a radio letter from Acting Commercial Attaché Donald L. Breed, Berlin. The main changes from the previous agreement include the fixing of the current coal tax at 1.50 gold marks per metric ton instead of 8 francs as previously, delivery of coal to the Régie at official German price minus 6 per cent and payment of overpaid taxes above \$15,000,000 on back coal taxes amounting to about \$2,000,000 of which \$1,000,000 is to be re-

turned at once. The current reparations coal deliveries amount to 1,650,000 tons monthly for which no payment is made, either by the Allies or by the German Government.

#### Ruhr Coal Output Near Normal

Coal output in the Ruhr during March is reported to have been 8,254,499 tons. This compares with 7,050,058 tons in February and 6,187,481 tons in January of this year, and 8,939,855 tons in March of 1913. Inasmuch as the output of three French "régie mines" is omitted in the figures for last March it is taken to mean that coal production in the Ruhr is now fully restored.

#### Export Clearances Week Ended May 17, 1924

##### FROM HAMPTON ROADS

	Tons
For Argentina:	
Br. Str. Eastgate for Buenos Aires...	6,010
For Brazil:	
Br. Str. Newtonmoor for Rio de Janeiro	5,620
Br. Str. King City for Rio de Janeiro	4,229
Br. Str. Ilvington Court for Rio de Janeiro	6,457
For Canada:	
Br. Str. Maraval for Georgetown	522
Br. Barkentine Maid of England for Charlottetown	588
For Chile:	
Br. Str. Mount Berwyn for Antofagasta	6,934
For Philippines:	
Amer. Str. Elkton for Cavite	6,003
For West Indies:	
Amer. Schr. Edward R. Smith for Nassau	577
Nor. Str. Bur for Port de France	6,229

##### FROM BALTIMORE

For Canada:	
Dan. Str. Kirsten Jensen	5,132

#### Hampton Roads Pier Situation

N. & W. Piers, Lamberts Pt.	May 8	May 15
Cars on hand	1,124	1,126
Tons on hand	71,241	70,178
Tons dumped for week	93,638	96,498
Tonnage waiting	17,000	10,000
Virginian Piers, Sewalls Pt.		
Cars on hand	1,091	1,215
Tons on hand	76,800	84,900
Tons dumped for week	94,824	73,295
Tonnage waiting	8,300	3,000
C. & O. Piers, Newport News:		
Cars on hand	960	633
Tons on hand	45,693	33,125
Tons dumped for week	73,903	63,886
Tonnage waiting	16,450	10,485

#### Pier and Bunker Prices, Gross Tons

PIERS	May 10	May 17†
Pool 9, New York	\$4.75@ \$5.00	\$4.85@ \$5.00
Pool 10, New York	4.60@ 4.85	4.65@ 4.75
Pool 11, New York	4.40@ 4.50	4.40@ 4.50
Pool 9, Philadelphia	4.70@ 5.05	4.70@ 5.05
Pool 10, Philadelphia	4.45@ 4.80	4.45@ 4.80
Pool 11, Philadelphia	4.30@ 4.55	4.30@ 4.55
Pool 1, Hamp. Roads	4.40	4.40
Pool 2, Hamp. Roads	4.25	4.15
Pools 5-6-7 Hamp. Rds.	4.00	4.00@ 4.15
BUNKERS		
Pool 9, New York	5.05@ 5.30	5.15@ 5.30
Pool 10, New York	4.90@ 5.15	4.95@ 5.05
Pool 11, New York	4.70@ 4.80	4.70@ 4.80
Pool 9, Philadelphia	5.00@ 5.40	5.00@ 5.40
Pool 10, Philadelphia	4.75@ 5.00	4.75@ 5.00
Pool 11, Philadelphia	4.50@ 4.80	4.50@ 4.80
Pool 1, Hamp. Roads	4.50	4.50
Pool 2, Hamp. Roads	4.25	4.25
Pools 5-6-7 Hamp. Rds.	4.15	4.00@ 4.15

#### Current Quotations British Coal f.o.b. Port, Gross Tons

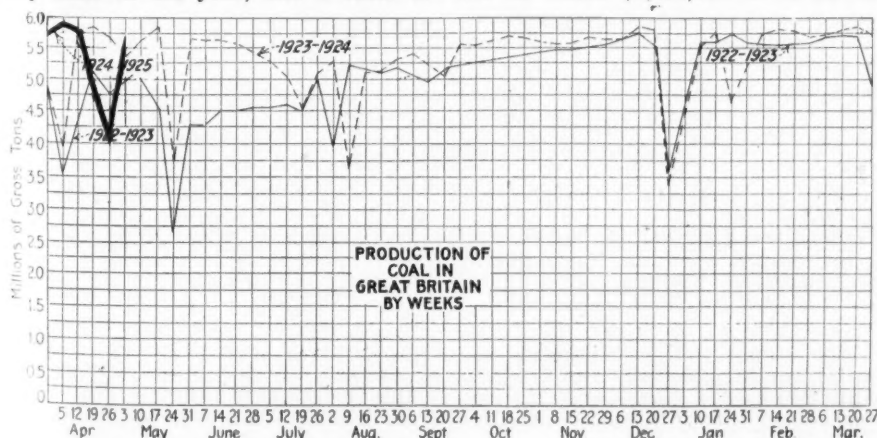
##### Quotations by Cable to Coal Age

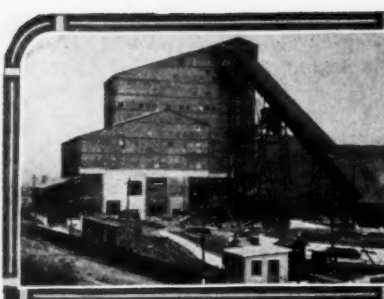
Cardiff:	May 10	May 17†
Admiralty, large	27s.6d. @ 28s.6d.	28s. @ 28s.6d.
Steam smalls	18s. @ 18s.6d.	19s.

##### Newcastle:

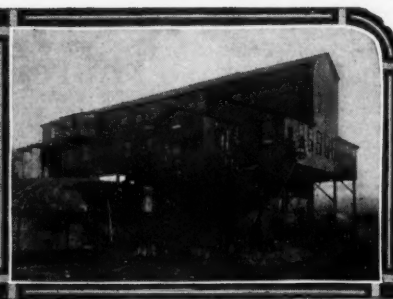
Best steams	26s.	26s.
Best gas	25s.	25s.
Best bunkers	23s.	23s.

† Advances over previous week shown in heavy type; declines in italics.





## News Items From Field and Trade



### ILLINOIS

Progress is being made on the new strip pit of the Equitable Coal & Coke Co., at Du Quoin. The H. H. Hall Construction Co., of East St. Louis, has completed the switch grade from the main line of the Illinois Central R.R. to the site of operations. It is expected that assembly of the huge electric stripping shovel will begin soon. Arthur F. Lee, chief engineer; T. S. Cousins, general superintendent, and Jas. McSherry, assistant superintendent, are the officials in charge of local operations for the company at Du Quoin.

The strip mine of the Hartshorn Coal & Mining Co., located near Elkhartville, south of Du Quoin, is now operating full blast. The concern uses a 300-ton electric stripping shovel and all coal mined is put over picking tables and loading booms in a complete steel tipple.

The Jewel Coal & Mining Co., which is operated now by the Sterling-Midland Coal Co., of Chicago, is preparing to re-open its No. 2 shaft at Du Quoin. This mine has been closed for about two months. The company is moving a large coal-crushing machine from its No. 1 mine to No. 2, where it will be installed and put into use immediately. Mine No. 1 of the company has been closed and it is questioned if the mine will ever be opened again. Clarence Bean, formerly of Brazil, Ind., is now in charge of the company's affairs in Du Quoin.

All official business of the defunct Southern Gem Coal Corporation, formerly of Chicago, is now transacted at Pinckneyville, home town of Receiver W. S. Wilson. From the latest announcements, no further progress has been made in reaching a conclusive settlement for the creditors of the concern. Meanwhile, some 2,000 miners in Perry, Williamson and Franklin counties are still awaiting pay for December 1923.

The City of Moline has awarded a contract to the Moline Consumers Co. to furnish coal for the coming year at a maximum price of \$3.35 on Sherman 2-in. screenings and \$6.43 for pure seam 6-in. lump. Approximately 4,500 tons of coal will be used.

Assurance has finally been given that a complete and detailed survey will be made of the Big Muddy River regarding the possibilities of dredging it and making it navigable. According to Congressman E. E. Dennison, the Rivers and Harbors Committee of the House of Representatives recently reported a rivers and harbors omnibus bill which carries the survey as one of its items. The bill is expected to pass.

### INDIANA

Contracts for the coal supply for the State of Indiana have been awarded by the State Purchasing Board. The Ogle Coal Co., Indianapolis, received a contract for 67,000 tons of mine-run deep-shaft coal on a bid of \$2.18 a ton f.o.b. mine. The same company got the contract for 20,100 tons of screenings at \$1.75 a ton. The Walter Bledsoe Coal Co., Terre Haute, was awarded contracts as follows: 12,000 tons of mine run, \$2.20; 24,900 tons of egg size, \$2.35; and 26,800 tons of screenings at \$1.75 a ton. The Bledsoe company's mine is close to the state farm and is able to ship with a low freight rate, which brought the total cost below that of competitors. Contracts for 10,000 tons for the State House and three other institutions are yet to be awarded.

W. H. Leland, of Chicago, president of the Leland Coal Co., closed a deal with Jabez Wooley, president of the Warwick Coal Co., for the Polk Patch mine near Boonville, for a consideration of \$500,000. The Leland company now owns nine mines in Indiana, Illinois and Kentucky. The Boonville mine will be opened at once as a strip mine, employing 60 men.

### MASSACHUSETTS

The Island Creek Coal Co., in its report for the first quarter of 1924, showed net profits of \$998,231 after depreciation, depletion and federal taxes, equivalent after preferred dividends to \$7.76 a share earned on 118,802 outstanding shares of common stock, par \$1. This compares with \$738,276, or \$5.58 a share earned, in the corresponding period of 1923.

### NORTH DAKOTA

Construction work on the new \$125,000 plant to be erected by the Lignite Coal & By-Products Corporation at Richardton, will begin soon, it has been announced by the company. Rev. P. Hoenerback, abbot of St. Mary's monastery at Richardton, is the president of the company.

### OHIO

Ohio mines produced 40,726,215 tons of coal in 1923, according to a preliminary report by the division of labor statistics of the Ohio Industrial Commission. The report covers all of the coal-producing counties of the state and is a forerunner of a more complete report to be issued in a few weeks. Of the total output, 2,056,918 tons was pro-

duced by pick mining; 35,830,921 tons by machine mining and 2,878,376 by stripping. Belmont county, as in former years, was the largest producer with 13,272,618 tons by machine mining and 1,368 tons by stripping. Jefferson County was next with 5,239,582 tons by machine mining and 985,653 tons by stripping and Athens County is third with 4,403,932 tons by machine mining and none by stripping.

The Ohio Coal & Iron Co. recently increased its capital stock from \$50,000 to \$75,000, at a meeting at the offices of the company in Dayton. W. F. Grimes is president and E. H. Jaeger is secretary of the concern.

Col. Tom Morgan, former president of the Cincinnati Coal Exchange and until recently in charge of the jobbing department of the Webb Fuel Co., has been appointed by Clinton De Witt, president of the Chesapeake & Virginia Coal Co., as its Western manager. This was the position held by George W. Hill, Jr., until his death recently in Asheville, N. C. E. Makin Jones will be retained as his assistant.

A news item in these columns April 24 stated that the Pittsburgh & Bessemer Coal Co. had been appointed exclusive agent in Ohio and northern territory for the product of the Boone County Coal Corporation, of West Virginia. This was in part incorrect, for while the P. & B. company has been named as agent for the latter concern, it has not been made exclusive agent.

A meeting of idle miners in the Nelsonville section of the Hocking Valley was held at Nelsonville, Ohio, May 15 in protest against the operation of certain mines in that region on a co-operative basis. Most of the miners are out of work and are opposing their more fortunate neighbors who have organized co-operative concerns to operate a few of the smaller mines. The meeting was not called by the miners' officials and therefore did not represent the entire district.

### PENNSYLVANIA

The Schuylkill County commissioners have decided to advertise the sale of Schuylkill County coal lands for non-payment of taxes. Ordinarily these advertisements are published only in the country newspapers, but the commissioners intend advertising these lands in New York, Philadelphia, Boston and Chicago papers. Attorneys for the coal companies say the proposed sale is a farce and predict there will be no bidders because the legality of the sale is questioned.



An outlaw strike, affecting all but one of the Lehigh Valley Coal Co. collieries in the Pittston region and throwing 11,200 mine workers idle, went into effect on Friday morning last. The strike order was issued by the general grievance committee. The cause for the strike was said to be the alleged refusal of Thomas Thomas, general manager of the company, to meet with International Board Member Alexander Campbell and District Board Member John Ruane, of the United Mine Workers, to adjust a strike of 800 men at the William A. colliery. Eleven collieries were idle because of the strike.

Harry M. Walker, who for the past eight years has been employed by H. M. Kanarr, mining engineer, Punxsutawney, has resigned his position and purchased the interests of Ned McCartney and will carry on a general engineering practice with headquarters in the offices formerly occupied by Mr. McCartney, rooms 9 and 10, Spirit Building, Punxsutawney.

The Lehigh Valley Coal Co. has established the position of efficiency expert in its mining organization and has assigned Sheldon Jones, formerly superintendent of the company's Lackawanna Division, to the post. He will make his headquarters at Wilkes-Barre. William Reutelhuber succeeds Mr. Jones as division superintendent.

Students taking the course in coal mining engineering at West Virginia University, numbering around twenty, will form a party which will visit the anthracite field during the second week in June. The students will see the mining and preparation of anthracite with all modern improvements used in its preparation. A detailed tour has been outlined which will include Hazelton, Wilkes-Barre, Scranton and Carbondale.

Directors of the Glen Alden Coal Co. on May 13 declared a dividend of \$3 a share on the capital stock of the company, payable June 20 to stockholders of record May 31. In December the company declared a dividend of \$2.50 a share, payable on the 20th of that month, while a year ago the company paid a \$2 dividend.

Edward Lloyd, Sr., 67, of Edwardsville, the oldest employee of the Kingston Coal Co. in point of service, has just retired after 57 years in the anthracite mines.

The Wyoming Valley Water Supply Co., which supplies the town and colliery at Centralia as well as the Mt. Carmel mines with water, has extensive improvements under way. The pumping house is being rebuilt and centrifugal pumps will replace the old plunger type.

Seward Button, former chief of the Department of Mines and part owner of the Beaver Valley Coal Co. operations in Scotch Valley, is negotiating for the purchase of the Tip Top Coal Co., controlled by Colonel Henwood, of Scranton. The mines practically adjoin the Beaver Valley colliery. The Henwood interests have been closed down for some time.

There were 151 fatal accidents in the industries of Pennsylvania during April, according to the Department of Labor and Industry Records. Of this total, 57 occurred in the mines. Schuylkill County led with twelve deaths and Lackawanna, also in the anthracite region, had nine. In the bituminous region, Westmoreland County led the list with six deaths, but Fayette and Washington each had five. Other mine fatalities occurred as follows: Anthracite—Luzerne, 5; Northumberland, 1; Carbon, 1; Dauphin, 1. Bituminous—Allegheny, 3; Cambria, 1; Clearfield, 1; Greene, 1; Indiana, 4; Jefferson, 1; Somerset, 1.



William Littlejohn

Elected president of the Rocky Mountain Coal Mining Institute at its last annual meeting. He was born in Scotland, emigrating to the United States in 1907. He became fireboss with the Utah Fuel Co. in 1910, and, after holding several other positions, became general superintendent of the Utah division of that company in 1919, which post he still occupies.

Incessant rains which caused all small streams in Cambria and Clearfield counties to overflow, have flooded many of the mines in the northern Cambria and Philipsburg regions. Approximately half the mines in the district are drift mines and most of these are flooded. Considerable damage will result.

State charters have been issued at Harrisburg to the following coal companies: Tip Top Coal Mining Co., Wilkes-Barre; capital stock, \$101,500; treasurer, Nat D. Stevens, 800 East Main street, Nanticoke; incorporators, Nat D. Stevens, L. M. Chapin, Brookline, Mass., and Philip V. Mattes, Scranton. Gledhill Coal Co., Lykens, \$15,000; treasurer, James H. Gledhill, Lykens; incorporators, James H. Gledhill and Mabel M. Gledhill, Lykens, and Raymond L. Filbert, Lebanon. Hazel-Yough Coal Co., Pittsburgh, \$10,000; treasurer, Ralph D. McKee, Bellevue; incorporators, William H. McNaugher and Frederick E. Milligan, Pittsburgh, and Ralph D. McKee, Bellevue. Tunnel Hill Coal Co., Butler, \$30,000; treasurer, J. A. Roberts, 714 West Penn street, Butler; incorporators, A. F. Myers, 542

Mifflin street, Butler; J. A. Roberts, Butler, and Chester C. Martin, Slippery Rock.

## VIRGINIA

The Virginia Smokeless Coal Co.'s office at Norfolk will be closed as of May 15, according to an announcement by its manager, T. M. Bailey. Mr. Bailey has resigned the presidency of the Hampton Roads Coal Club.

## WASHINGTON

T. F. Kennedy, of Seattle, has been elected president of the Morton Coal & Coke Co., of Centralia, and J. M. Bell was made secretary at the recent stockholders' meeting. It is probable that the company's mine at Centralia will be operated on a lease instead of by the company.

Briquets from the new Amalgam Coal Co.'s Trent process plant now building in Spokane may be offered on the market as early as the middle of July. The plant, built on the unit system for future enlargement, is to be 166x30 ft. on the ground and will be capable of treating between 400 and 500 tons of coal a day. Washed coal from the Corbin mine of the Corbin Coal Co. Inc., in the Crow's Nest Pass field of British Columbia, will be used. George W. Evans is the engineer in charge of construction.

## WEST VIRGINIA

The Roderfield Pocahontas Coal Co. has been organized to develop a 600-acre lease at the mouth of Spice Creek, near Roderfield. Officers of the new company are J. W. Strickler, of Welch, president and general manager; O. E. Linkous, of War, vice-president, and R. L. Page of Berwind, secretary-treasurer. This company is capitalized at \$150,000. There are four seams in the acreage, three of which are above water level, the coal ranging from 4½ to 6 ft. thick.

The Tompkins Fuel Co., of Charleston was organized May 5, the charter having been obtained by Harold F. Tompkins, Wm. G. Conley and Clyde B. Johnson, of Charleston; Roger W. Tompkins, of Cedar Grove, and Grant E. Tompkins, of Hugheston. The company has taken over a mine at Cedar Grove operating in a 6-ft. seam of Kanawha Splint Coal and also has started work in the byproduct mine on the property which has not yet been fully installed. Shaker screen tipples and picking tables will be installed at an early date and the mine will be electrified throughout, and modern machinery installed. The Tompkins interests own the land in fee.

Harold F. Tompkins of Charleston; Roger W. Tompkins, of Cedar Grove, and Grant E. Tompkins, of Hugheston, who have been connected with the operation of mines in the Kanawha field for some time, have organized the Tompkins Fuel Co., capitalized at \$100,000. The company will take over a going mine at Cedar Grove, operating a 6 ft. seam of splint coal and also will open a byproduct plant. The property is owned in fee by the new company. It

is proposed to erect a tippie equipped with shaker screen and picking tables and also to electrify the mine throughout and equip it with the most modern machinery.

The Brady-Warner Coal Co. has put its Monon No. 1 mine, in the Monongalia County field, on an open-shop basis, with the 1917 wage scale in effect. Monon No. 1 mine is in the Pittsburgh vein. The new order does not affect the mine at the same place which taps the Sewickley vein, as that mine has not been operated for some time. The company also owns a mine at Osage, where both the Pittsburgh and the Sewickley seams are mined, but no announcement has been made with reference to the latter mines, which have been shut down since the first of the year.

The Elkhorn-Piney Coal Co. has closed its Huntington office and dispensed with the services of the entire force connected with the office there. This company owns mines in Raleigh and Logan counties, W. Va., and at Weeksbarrie, Ky. All mining superintendents in the future will report direct to D. T. MacLeod, vice-president in charge of operation at Milwaukee, Wis.

Development work is now under way on the Faraday tract, formerly the Frick holdings in McDowell County, W. Va., and Tazewell County, Va. The tract comprises about 30,000 acres. Under the direction of Col. James Elwood Jones, vice-president and general manager of the company, two plants are being installed on Dry Fork of Tug River, four miles above Hartwell. About 400 houses are under construction. The mines will be well equipped mechanically throughout so as to eliminate human labor as much as possible.

The Sardinia Coal Co., of Charleston, has been organized to operate on a small scale on Coal River. It is capitalized at \$25,000. Principally interested in the new company are Toney Mamca, Peter Mascle, Toney Dadola, Joe Piredda, John Morria, all of Olcott.

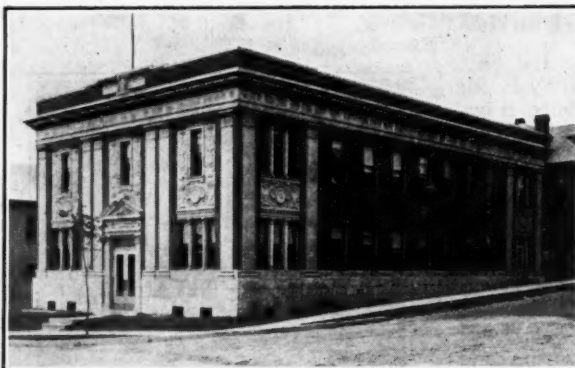
J. C. Pack, of Freeman, was recently elected president and general manager of the Smith Pocahontas Coal Co. Mr. Pack is well known in the Pocahontas and Winding Gulf districts having been connected for several years with the Iroquois Coal Mining Co., operating at Iroquois.

## CANADA

The price of American anthracite in Montreal has been reduced from \$17 a ton to \$15.25. A fight for the Montreal market has begun between merchants handling Welsh and Scottish coal and those selling the United States product. It is stated that British interests will this year lay down 300,000 tons of coal, which is half of the city's supplies.

Excellent prospects for Canadian coal mining are foreseen by Charles Fergie, president of the Atlantic Coast Collieries, Ltd. His company recently acquired 17 square miles of coal fields on the west coast of Cape Breton.

The British Empire Steel Corporation is conducting extensive investigations with a view of improving the Sydney Mines coal field, instead of planning to close it out. All coal-mining operations have been curtailed for the present because of the limited demand. Because of the high cost of production the Jubilee mine is temporarily closed. Vice-president J. E. McLurg states that the only mining the corporation can at present do is for shipping, and by closing down the



Clearfield Bituminous Corporation Building, Indiana, Pa.

This company is building a new tippie at Sample Run, about eight miles from Indiana.

Jubilee the Princess and Florence collieries can be operated full time. A survey of the field has been ordered and extensive drilling operations will be begun shortly with a view to lowering the cost at the Jubilee and possibly opening new pits.

A report of the Dominion Bureau of Statistics for January just made public shows an output of coal in Canada of 1,490,000 tons, an increase of 16 per cent over the January average for the preceding five years. There was an increase of 330,000 tons in Alberta; 28,000 tons in British Columbia and 6,000 tons in New Brunswick, but a decrease of 150,000 tons in Nova Scotia and 3,000 tons in Saskatchewan. Imports of coal in January were 1,233,000 tons, a decrease of 343,000 tons compared with December and a decrease of 5 per cent over the five-year average for January.

The National Coal Co., Ltd., has been incorporated by B. E. Bull, James C. Shaw, John A. Shaw and others with a capital of \$50,000 and head office at Toronto.

Some of the smaller collieries of Pictou County, N. S., are obtaining electric power from the hydro-electric power development of Sheet Harbor 60 miles distant and anticipate a considerable decrease in operating costs. New collieries opening up will in future look to this source of power supply.

The Piron process of low-temperature coal distillation, for which big savings in fuel economy are promised, is now installed at the new furnaces of the Ford Motor Co. of Canada, Ltd., Walkerville, Ont. Completion of a 400-ton a day plant there has been made by the Piron Systems' engineers. They are also at work on an installation with an ultimate capacity of 12,000 tons daily, at the River Rouge plant of the Ford company, to be completed during the year. The Ford furnaces are the first commercial adaptation of the process.

Coal Service of Canada, Ltd., has been incorporated with a capital of \$300,000 and head office at Montreal, by Daniel P. Gillmor, Wallace R. Henry and Jean P. Cosselte.

McMaster Coal & Transportation Co., Ltd., of Montreal, capitalized at \$500,000 has recently been incorporated.

Anglo-American Fuel Supply Co., Ltd., of Toronto, has been incorporated with \$50,000 capital, by Roland O. Daly, Charles E. L. Babcock and Harold E. Manning.

## Trade Literature

**The Treatment of Boiler Feed Water for Highly Overloaded Boilers**, David Henderson, of the Dravo-Doyle Co., Pittsburgh, Pa. Distributed by the H. S. B. W. Cochran Corp., Philadelphia, Pa. Pub. No. 1195. Pp. 8; 6x9 in.; illustrated. Contributory causes of priming and foaming are described, together with a statement outlining in what respect water treated at boiling point is best adapted for use in overloaded boilers.

**The Osgood Co.**, Marion, Ohio, has issued the following four-page illustrated circulars: No. 237, covering the use of steam shovel equipment and highway construction; No. 242, the use of steam shovels for sewer and trench excavating work; No. 243 describing the use of steam shovels when converted to clamshell and dragline outfits.

**Fumes Encountered in Mining Operations and in the Handling of Explosives**, by J. Barab, Hercules Powder Co., Wilmington, Del. Pp. 38; 8x10 in. Copies of this book may be obtained by writing to the advertising department of the above company.

**Fourth Standardization Bulletin**, by the Standardization Division of the American Mining Congress, Washington, D. C. Pp. 328; 6x9 in.; tables. Proceedings of the fourth national standardization conference held in connection with the twenty-sixth annual convention of the American Mining Congress.

**Condulets for Switch and Plug Receptacle Outlets**, Crouse-Hinds Co., Syracuse, N. Y. Four-page folder No. 8, covering condulets for various uses.

**Twenty-fifth and Twenty-sixth Annual Reports of the Bureau of Labor and Industrial Statistics of Virginia**, Part I covers period from Oct. 1, 1921, to Sept. 30, 1922, and Part II from Oct. 1, 1922, to Sept. 30, 1923. Pp. 224; 6x9 in.; tables.

**Frogs and Switches**, Helmich Foundry-Machine Co., Fairmont, W. Va. Pp. 21; 5x8 in.; illustrated. Catalog No. 5. Describes standard spring split switch, riveted plate frog, switch connections and throws, standard split switch, light rail turnout, etc.

**Analyses of Samples of Delivered Coal**, by Ned H. Snyder, Bureau of Mines, Washington, D. C. Bulletin 230. Pp. 174; 6x9 in., tables. Covers samples collected from July 1, 1915, to Jan. 1, 1922, and contains a chapter on Tidewater Pool Classifications.

**Production and Briquetting of Carbonized Lignite**, by E. J. Babcock and W. W. Odell, Bureau of Mines, Washington, D. C. Bulletin 221. Pp. 82; 6x9 in.; illustrated.

**Walter A. Zelnicker Supply Co.**, St. Louis, Mo., two-page bulletin No. 315 covering locomotives, cars, rails, pilings and tanks.



## Traffic News

### Provides for Taking Control of Road from Coal Company

After a rehearing the Interstate Commerce Commission has issued a conditional finding that public convenience and necessity will require the construction and operation by the Jefferson & Southwestern of a railroad from Mr. Vernon to Nason, Ill., at which a coal mine is being developed, and for about three miles westerly to a connection with the C. B. & Q., if and when a valid arrangement has been made and approved by the commission under which the connecting railroads will be afforded an opportunity, at any time within five years, jointly or severally to assume control of the new railroad company by purchase of stock or by lease. On March 14, 1923, the commission denied the company a certificate, but with the approval of the Illinois Commerce Commission it has built the line from Mt. Vernon to Nason and is operating as an intrastate carrier.

### Must Restore Allowance for Boarding Car Doors

By decision of the U. S. Supreme Court, May 5, dismissing an appeal for want of jurisdiction, the order of the Public Utilities Commission of Colorado directing the Denver & Salt Lake Railroad Co. to resume in its coal tariffs an allowance of 50c. per car to shippers who board the doors of box or stock cars loaded with coal will stand. The company discontinued the allowance and the Bear River Coal Co., the Hayden Bros. Coal Corporation and others appealed to the Public Utilities Commission, which directed that the allowance be continued. The State Supreme Court sustained the order and the railroad appealed to the U. S. Supreme Court. This court found no federal question involved. The evidence showed that in Colorado at times box or stock cars are supplied for coal shipments and that the shippers board the inside of the doors to protect the doors.

## Obituary

William Quinn, long identified with the coal industry, died suddenly at Harrisburg, Pa., May 14. With Mrs. Quinn he was driving through to Philadelphia and was stricken with pneumonia. Mr. Quinn was 35 years of age and for several years was sales manager for the Winifrede Coal Co., Cincinnati. During the war he started the General Coal Co., at Huntington, W. Va., but due to heavy taxation by the government and a disastrous lawsuit, this went out of existence about three years ago. He then was identified with the Merrimac Fuel Co. but retired from it prior to its failure and was engaged in the tax-adjustment business at the time of his death.

J. C. Brooks, who because of his 360 lb. was known as "the biggest man in the coal trade," died on May 9 at Greenville, S. C., where he was located as sales agent for the Southern Coal & Coke Co. with selling headquarters in Cincinnati. The body was brought to his old home in Lexington, Ky., where the funeral was held on the 10th. E. C. Mahan, director of the National Coal Association and Nolan Mahan, of Cincinnati, attended the funeral.

James P. Hickey, of Springfield, Ill., died May 8 of heart disease, after one month's illness. He was 45 years old and in 1919, helped organize the Central Illinois Mining Co., of which he became president, and of the Pontiac Coal Mining Co. He also became president of the Prairie State Coal Co., which post he held at the time of his death. Before becoming identified with mining in Illinois he was a member of the sales organization of the Pittsburgh Coal Co.

William L. Kingman, at one time general coal agent of the New York Central R.R., died at his home at Yonkers, N. Y., May 8, in his 83d year. In the early 80's Mr. Kingman became divisional freight agent of that road at Rochester, but with the rapid expansion of the coal trade he was made general coal agent with headquarters in New York City. On his retirement from active service, in 1908, he was industrial agent for the Central.

## Coming Meetings

**International Railway Fuel Association.** Sixteenth annual convention, May 26-29, Chicago, Ill. Secretary-Treasurer, J. B. Hutchinson, 600 Michigan Ave., Chicago, Ill.

**The American Society of Mechanical Engineers.** Spring meeting May 26-29, Cleveland, Ohio. Secretary, Calvin W. Rice, 29 West 39th St., New York City.

**American Wholesale Coal Association.** Annual convention, White Sulphur Springs, W. Va., June 3-4. Secretary, G. H. Merryweather, Chicago Temple Bldg., Chicago, Ill.

**West Virginia Coal Mining Institute.** Annual meeting June 3 and 4, Elkins, W. Va. Secretary, R. E. Sherwood, Box 1026, Charleston, W. Va.

**The National Foreign Trade Convention.** June 4-6, Boston, Mass. Secretary, O. E. Davis, 1 Hanover Square, New York City.

**National Retail Coal Merchants' Association.** Annual meeting, Hotel Virginian, Bluefield, W. Va., June 4-6. Secretary, Walter D. Rogers, Transportation Building, Washington, D. C.

**Southwestern Interstate Coal Operators Association.** Annual meeting June 10, Kansas City, Mo. General Commissioner, W. L. A. Johnson, Keith & Perry Bldg., Kansas City, Mo.

**Illinois & Wisconsin Retail Coal Dealers Association.** Annual meeting, June 10-12, Delavan, Wis. Secretary, I. L. Runyan, Great Northern Bldg., Chicago, Ill.

**Illinois Mining Institute.** Annual meeting, June 12-14 from St. Louis via boat down the river. Secretary, Martin Bolt, Springfield, Ill.

**Midwest Retail Coal Association.** St. Louis, Mo., June 17-18. Secretary F. A. Parker, St. Louis, Mo.

**American Society for Testing Materials.** annual meeting, Chalfonte Hotel, Atlantic City, N. J., June 23-27. Secretary, Edgar Marburg, University of Pennsylvania, Philadelphia, Pa.

**American Institute of Electrical Engineers.** annual convention, June 23-27, Edgewater Beach, Chicago, Ill. Secretary, F. L. Hutchinson, 29 West 39th St., New York City.

**First International Management Congress.** Prague, Czechoslovakia, July 21-24.

**World Power Conference.** Wembley, London, England, June 30-July 12. O. C. Merrill, Federal Power Commission, Washington, D. C.

## New Equipment

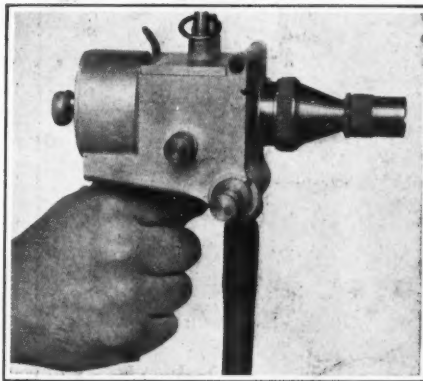
### Metal-Spray Gun Prevents All Corrosion

Originally conceived as a means of coating iron and steel with lead to provide protection against atmospheric corrosion, the Schoop metal coating process is now claimed to be perfected so that any of the commercial metals, either in wire or dust form, may be applied to nearly all materials.

It is rapidly becoming an important factor in several industries, and many are taking advantage of its possibilities. Coatings of molten metal may be attached to all or any part of a surface, regardless of its character, size, position or location. Coatings also may be applied to work either before or after fabrication and to any reasonable thickness desired, either for decoration, protection from corrosion and chemical action, for increasing dimension or weight, for altering shapes or for repairing defects in surfaces. Successive coatings of different metals, regardless of their melting temperatures, may readily be applied.

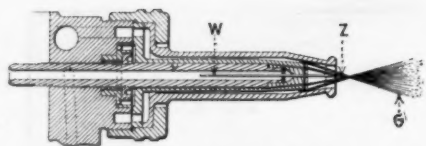
The gun shown in the illustration weighs 3½ lb., is connected to standard acetylene and oxygen cylinders and a supply of compressed air at 50 lb. pressure. In normal operation it consumes approximately 15 cu.ft. of acetylene per hour, 15 cu.ft. of oxygen per hour and 50 cu.ft. of air per min. Metal in the form of standard gage wire is automatically pulled from a reel into the rear of a gear case and fed uniformly and continuously at a rate of from 12 to 24 ft. per min. to the muzzle of the barrel, where it enters a continuous reducing flame zone developed from the gases and air. Here it is melted and blown at a velocity of about 3,000 ft. per sec. in a very fine spray onto the surface being coated.

The mechanism within the gear case consists of an air-driven turbine operating a wire-feeding and straightening device for leading the metal into the



**Gun Applies Protective Metal Covering to Surfaces**

This device makes its own ammunition from wire. It bombards the surface which is to be coated with minute particles of molten metal. It is especially adapted for shop or field use on any material regardless of its size, character, shape or position.



**Nozzle of Metal Gun**

The wire, W, is automatically fed into the reducing flame zone Z, at such a speed that the position of the end of the wire is stationary. G is the cone of fine metallic particles which are deposited by impact.

barrel. The wire remains cold and unaltered until it emerges from the muzzle, melting and undergoing transformation into spray at a point of  $\frac{3}{8}$  in. from it.

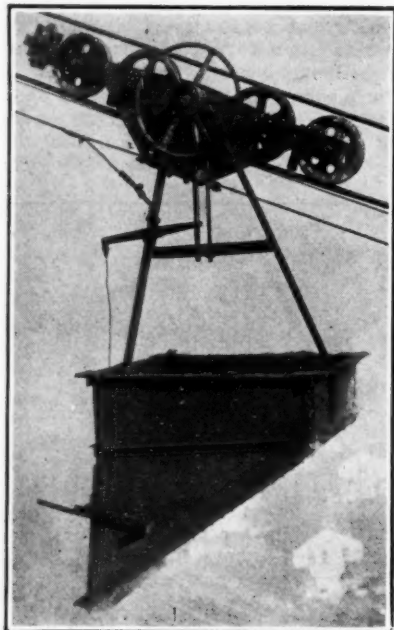
The muzzle is held 3 to 4 in. from the surface to be coated. Its temperature is raised but slightly, making it possible to apply coatings to the most delicate objects.

The spray is essentially an air brush which applies molten metal. The Metals Coating Co. of America, 495 N. Third St. Philadelphia, Pa., are manufacturers of the equipment.

### Tram Bucket Dumps Itself At Any Point Desired

Dumping refuse at a distant point from the coal tippie long ago became a serious problem with the Tierney Mining Co. of Stone, Ky. All the available space around the tippie had been filled and the nearest additional dumping ground was a hollow approximately 1,200 ft. away. The company last winter installed a new type of self-dumping bucket tramway made by the Roderick & Bascom Rope Co. which appears to have met all the demands.

The striking feature about the tramway is the provision for automatically dumping the 55-cu.ft., front-door discharge bucket. As shown in the illustration, this bucket is equipped with a set of reducing gears engaging, at one



**Bucket for Dumping Mine Rock**

At the Tierney Mining Co's plant near Stone, Ky., a two-bucket installation handles 40 tons an hour of mine refuse a distance of 1,150 ft.

end of the train, the shaft of one of the track wheels. The other end of the train, by a worm, operates a perpendicular threaded shaft. The revolution of this shaft moves a trip block up and down. At the outbound end of the bucket's travel this block pushes down the trip lever which opens the bucket door. When the bucket is made to travel in the opposite direction the trip block runs up the shaft again, permitting the bucket door to close and latch for the next load. This trip can be adjusted so that it discharges the bucket at any predetermined location.

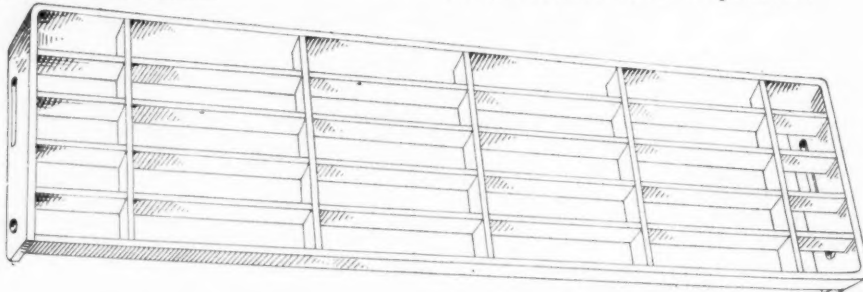
According to General Manager G. C. Wood, of the Tierney Mining Co. this mechanical arrangement operates without causing a shock like that received by the bucket when it is tripped by a clamp on the rope. It makes it unnecessary for a man to make the perilous trip out in the bucket to adjust such a block or to re-track a bucket that has jarred off. With the front-door discharge the load in the bucket is released a little more gradually than with a drop bottom, thus reducing the recoil.

The Tierney installation is a two-bucket tramway operating at a speed of 600 ft. per minute and capable of handling 40 tons per hour. One man operates it from the loading point.

### Improved Steel Stair Tread Prevents Dizziness

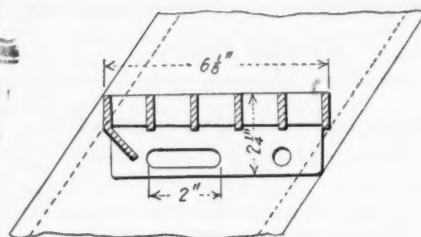
One of the greatest objections to the use of open-grating stair treads has been the fact that men walking down the stairs, especially if they are carrying a load, find it difficult to tell just where the edge of each tread is and in some cases become dizzy. Consequently, heretofore, many designing engineers who could use open-grating treads to great advantage have been forced to use the flat solid type.

To meet just such conditions, the Mitchell-Tappen Co., 15 John St., New York, have developed a tread which has a clearly defined nosing. With this new tread it is not necessary to paint the outer edge or adopt any other makeshift change. The edge is made up of a nosing bar which is bent backward under the edge at an angle of approximately 45 deg. The bending of this nosing bar in no manner tends to clog the openings in the tread as it sheds both dirt and water just as the body of the tread itself does. The effect of this improvement is to produce the appearance of a solid line sharply defining the outer edge of each tread, and therefore lessening the chance of confusion.



**Open Grating Tread With Outer Edge Well Defined**

To prevent the steps from causing dizziness and to locate definitely the edge of each stair tread, this new step has a wide sloping nose bar.



**Cross-section of Tread**

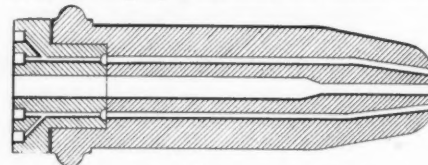
The outer bar is bent to an angle of 45 deg., thus defining the edge of the tread and at the same time permitting the use of open-grating design.

Coal-company engineers will find this new tread suitable for tipples, breakers and washeries, especially in buildings where material and water are likely to lie on the steps and make ascent or decent particularly dangerous.

### Metal Cutting Torch

A new cutting tip designed by the Alexander Milburn Co., of Baltimore, Md., marks another advance in the development of the oxyacetylene apparatus.

This tip, according to the manufacturers, has all the advantages of standard tips and many other distinctive features highly desirable for metal cut-



**New Gas-Cutting Nozzle**

The renewable seat makes it an easy matter to equip the torch with a new tip. This new tip mixes the gases much more efficiently and shortens the time ordinarily required to make a cut.

ting. A better method for mixing the gases and preheating the cutting oxygen, as well as giving added velocity and penetration to the preheating and cutting tip are some of the advantages claimed for it. The tip is provided with a renewable seat which can be replaced at very low cost, making it unnecessary to remachine or throw away the whole outfit. Aside from this, the renewable seat facilitates cleaning and maintenance. It is possible to reface a standard tip in a high speed lathe, but frequently such a lathe is not available where the torch must be used. It is claimed that the savings in time, oxygen, and acetylene effected by this new tip are approximately 18 per cent of the former cost of operation.